



# **Partners for Water and Sanitation**

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**Southern Nations, Nationalities and Peoples Region  
(SNNPR) Water Resources Bureau:  
Capacity Development to provide technical and  
managerial support for the water supply strategy and  
re-commissioning of Water Schemes  
(88 ETH)**

**TECHNICAL REPORT**

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## LIST OF ACRONYMS

MDGs	Millennium Development Goals
MIS	Management Information System
NGOs	Non-Governmental Organisations
OFWAT	Office of Water Regulation - UK
PAWS	Partners for Water and Sanitation
PEST	Political, Economic, Socio-cultural and Technological
SWOT	Strengths, Weaknesses, Opportunities and Threats
WEDC	Water Engineering Development Centre – Loughborough University
WHO	World Health Organisation



## 1.0 EXECUTIVE SUMMARY

The purpose of this report is to assess the requirements and make recommendations to support the re-commissioning of water supply schemes in the Southern Nations, Nationalities and People's Region (SNNPR), Ethiopia. Together with providing assistance in the building of human capacity within the SNNPR Water Resources Bureau in support of the implementation of the Regions' water sector strategy.

The scope of the report has been developed by the SNNPR WRDB and the PAWS in country manager, based on recommendation from a visit and report carried out in early 2007. This report highlighted the demand to establish a needs-based training package for the re-commissioning of water schemes, as the region had circa 7300 schemes (original report 6000 schemes), of which around a third had failed.

This report was carried out by Partners for Water and Sanitation (PAWS), and focused initially on the technical and operational challenges relating to the re-commissioning of water schemes, although it also looked at the wider challenges around culture, environment, policy and federal structure, stakeholders and funding within the remit of Human Resource Capacity Development within the organisation. The team comprised of the Ethiopian country manager, and two PAWS UK project managers from the PAWS UK Partner Wessex Water. The PAWS Partner project managers were selected to lead the report based on their expertise within water resource management, organisational development, business transformation and knowledge of water resource and supply management in Africa.

The assessment was based on a visit in early March 2008, where the team met with SNNPR WRDB management teams including, department heads and senior staff. A workshop was carried out at the beginning of the visit, which included WRDB senior management, SNV, JICA, and RiPPLE representatives. The workshop covered a range of topics (agenda shown in appendix 2) and was followed up by meetings and site visits. These meetings were largely informal, covering such topics as current business challenge, working relationships, methodologies employed to meet increasing demands, barriers to water resource and supply management and the future



issues for the WRDB and the Ethiopian water sector. Further discussions were held with Agencies involved in key activities, SNV, Hawassa University a UNICEF South sub office, Federal Ministry and other support structures within the water sector to provide context to the issues. These discussions included topics such as policy, health, education, economics, reform and water provision. Based on this consultation, a report submitted to RiPPLE, Ethiopia on Implementation of Universal Access Plan (UAP) in SNNPR and best practice research, the findings obtained were reviewed and presented as recommendations of the assessment.

Some of the initial recommendations of the assessment are the following:

- To develop an increased knowledge of the SNNPR-WRDB assets, by collecting and collating asset information into a database that will identify site, location, source type, etc. The database will be built on the information collated from previous projects, and will build on the work being undertaken by JICA, SNV and TVTC's (Appendix 3)
  - To Identify all the sites that are currently out of production within the SNNPR, with site reference, location and site type (shallow well, deep well or protected spring) to support the mapping of the re-commissioning sites onto a GIS Systems to support asset and program management
- To implement a monitoring policy and procedure which will identify water resource information to be collated from each site, with type of data, data frequency and control mechanisms to measure against MDG and UAP targets
  - Design and implement simple training short courses in basic village level hydrometric monitoring to allow early diagnosis of source yield issues. Select regional resources to become trainers and via a programme of "training of trainers" roll down to Zone or Woreda level.
  - Design a suitable monitoring network that will enable the assessment of well, borehole or spring performance, of local and/or regional water resource issues and allow differentiation between them
  - To identify all sites where hydrometric monitoring (groundwater level dipping) is not feasible due to sealed well and borehole headworks and the lack of "dip tubes", to produce a programme of modifications to facilitate the collection of this data.



- Review equipment standardisation and need for modifications to assist access for monitoring and/or repair, linked with supply chain optimisation.
- Develop a two page summary to be attached to each source highlighting key asset information, including general asset maintenance and reliable monitoring data. Template to be provided by PAWS, before being finalised and translated as appropriate to each site. (see appendix 9)
- Establish and maintain an asset database of all improved water sources to assist in decision making regarding appropriate re-commissioning response. This database to be managed via the lowest appropriate Water Resources Bureau level.
- Develop and formalise management and monitoring data reporting 'down from' and 'up to' appropriate levels within existing Water Bureau structure in order to enable appropriate and timely response to re-commissioning issues.
- To highlight the most appropriate centre of excellence within each zone/woreda for the purpose of coordinating re-commissioning activities. This will include the skills, resources, facilities and location and may be focused within either high or low performing Woredas
- To link WRDB Capacity development with other initiatives being delivered within the region to ensure that maximum benefit is achieved. This will include working with key agencies, ministries to delivered a sustainable future including TVTC's, UNICEF, SNV and JICA
- Develop and formalize management of relationships with water and sanitation efforts of NGO's and other service providers
- Review and define the WRDB's operating mandate, in relationship to the ability to deliver within the current frameworks, and advise on the existing water policy to clearly outline the role and responsibilities of WRDB
- Develop the existing budgetary and action plan process into an auditable business plan with a structured road map for dealing with re-commissioning and business improvement.
- Support the development of appropriate operational, technical and financial guidelines to enable the implementation of the regional water sector strategy, utilising resource and funds from both within the bureau and via external sources.
- To continue to assess the impact on human capacity from changes within the Federal Structure and legal framework within which the WRDB operates, including the potential role of a state and/or national regulatory agency to monitor the provision of water services strategy



## 2.0 INTRODUCTION

Partners for Water and Sanitation (PAWS), is a Department for International Development (DFID) funded initiative established following the World Summit on Sustainable Development (WSSD) in 2002. At WSSD the international Community determined to fight water poverty by agreeing the Millennium Development Goal to reduce by half the 1.1 billion people without access to adequate water provisions, with a subsequent commitment to halve the 2.4 billion people without access to safe sanitation. PAWS support is directed towards projects that emphasize the importance of sustainability of service provision, and which can be replicated across other regions and partner countries. Projects are demand driven and responsive to the needs of the water and sanitation sectors in country.

Adequate water supply coverage in the Southern Nations Nationalities and People Region (SNNPR) of Ethiopia, can only be attained if all the of the existing 7300 plus newly expanded water supply schemes in the Region are in operation. More than 30% of schemes (over 2000) are currently not functioning. This is preventing the Region from effectively addressing the Universal Access Plan (UAP) for water or supporting the national (MDG) targets for water supply

This project follows an initial report from a PAWS scoping visit in January 2007 (40-Eth) which identified limited capacity within the Regional Water Resources Bureau (WRDB), water desks at Zonal and woreda levels and within water committees. The Water Resources Bureau (WRDB) of SNNPR has requested help from PAWS to establish needs based training packages for the re-commissioning water schemes, as those responsible for the re-commissioning are not sufficiently trained

Partners for Water and Sanitation (PAWS) works with developing countries providing unrivalled knowledge and expertise to help them supply clean water and adequate sanitation to their population. An innovative not-for-profit initiative, the partnership has members from three sectors: government, private enterprises ranging from water companies to engineering groups, and NGOs such as WaterAid, Tearfund and a trade union. This allows the partnership to draw from the widest possible range of expertise to rapidly respond to each unique challenge and to help local African partners develop and strengthen capacity and build truly sustainable solutions.

Each partner brings a unique set of skills and expertise. These are matched with a wide range of



potential needs identified with partnering countries at a national or local level, working alongside their existing water and sanitation programmes. The emphasis of partner involvement is on-the-ground capacity building, such as knowledge transfer, to ensure the sustainability of each project and to encourage any lessons learnt to be shared and used again throughout the region.

More information on the PAWS partnership is available at [www.partnersforwater.org](http://www.partnersforwater.org) and information on PAWS partner Wessex Water is available at [www.wessexwater.co.uk](http://www.wessexwater.co.uk)

The PAWS project 88 Eth terms of reference (See Appendix 1), is to assist the SNNPR WRDB and work in conjunction with associated agencies such as the Technical Vocational Training College (TVTC) in SNNPR, UNICEF, SNV, JICA, RiPPLE, Hawassa University and other key stakeholders, currently active in the area of capacity building within the WRDB, focusing on training support for the re-commissioning of water supply schemes. This is in line with the PAWS strategy of working in partnership with existing donor projects supporting institutional reforms in Africa.

The objectives of the PAWS support are to:

1. Develop needs based training materials and to deliver initial training packages, to support sustainable re-commissioning of water schemes
2. Provide technical and management support to implement the Region's water sector strategy, by assisting in the development of appropriate guidelines and manuals to help build the capacity of staff in the WRDB

The scope of the PAWS UK partner includes:

- Assessment of current levels of experience amongst key beneficiaries (WRDB staff, water committees, etc.);
- Developing training packages for re-commissioning schemes, based on a participatory needs-assessment;
- Delivery of capacity building support to implement the training packages Training of Trainers (ToT);
- Monitoring the capacity of trained staff to implement learning and an impact assessment of the training.



The content of the training packages will be developed through a needs-based assessment process, but the WRDB has requested that it considers:

- Appropriate levels of service (based on water availability) applicable on a community/scheme basis;
- Systems for defining roles and responsibilities for scheme management, from regional (zonal) to community (Woredas/Kebella) level;
- Systems for analysing current processes for managing schemes and stakeholder engagement;

The inputs in the assignment were made by the following team:

- Chris Chambers: March 1 – 9,2008
- Paul Stanfield March 1 – 9,2008
- Melkamu Jaleta March 1 – 9,2008

The input required and the process followed complied with the terms of reference. This report documents the work undertaken by the team in carrying out the assignment and summarises the tasks as well as the outcomes and recommendations.

The assignment was carried out at the offices of SNNPR WRDB in Awassa, Ethiopia.



## 3.0 PROCESS FOLLOWED AND WORK DONE

### 3.1 APPROACH AND METHODOLOGY

At the commencement of the assignment, the PAWS Project Managers, In-Country Manager (Ethiopia) and project lead partner discussed the objectives of the assignment, the context of the work and the expected deliverables. In the course of the project every effort was made to utilise the knowledge that PAWS had already collated, clarify understanding of the Water Resources Bureau through interaction with the organisation and reducing the level of duplication of activities.

After a desk review of documents relating to the water sector both at Regional and Federal government body Level provided by WEDC, an initial meeting with the SNNPR WRDB senior management provided a preliminary overview of the organisation, context and scene setting for the project and introductions. Subsequently, several meetings were held with department and unit heads and senior staff. Key to the process was to undertake a workshop (Appendix 2), this was lead by the PAWS teams in conjunction with SNNPR Senior management and representatives of key agencies.

In addition to the workshop and meetings, research of best practice and benchmarking of industry leaders, including UK and global water utilities, together with other high performing sectors have been used to support the recommendations.

Informal meetings and discussion where also held over the course of the visit with other agencies and stakeholders. Following the visit any amendments or updates have been incorporated into the report:

Organisations and individual included in assessment discussions

- *Jamal Reshid, SNNPR WRDB Head*
- *Agosa Abate, SNNPR WRDB Deputy Head*
- *Nuredin Assaro, SNNPR WRDB Water Supply and Sanitation Department Head*
- Jackson Wandera, SNV Awassa sub office Director
- Getachew Haile - Michael, UNICEF South branch office water sector officer
- Tetsuji Niwano, JICA Project Team Leader



- Fasika Bete, Dean of Faculty of Technology of Hawassa University
- Aschalew Sidelil, RiPPLE Woreda Coordinator
- Mark Harvey, DFID advisor to Ministry of Water Resources

The list of the participant of the Workshop is also shown in the Appendix 7

### **3.2 INITIAL DEBRIEF**

There was no formal presentation made to the SNNPR WRDB at the end of the visit. Some short exit briefings were carried out with Ato Jamal Reshid (Bureau Head), Ato Agossa Abate (Deputy Bureau Head) and Ato Nuredin Assaro (WSS department head) covering the work achieved the high level of support we had received for their teams, some of our initial thought and concerns, together with timescales for the deliver of a draft executive summary and the final report

The draft executive summary was provided four weeks following the end of the visit. This timescale was proposed to allow for additional research, validation and consultation. This initial feedback was passed to the SNNPR WRDB and other key stakeholders to ensure that recommendation and implementation aligned other initiative and reduced the risks of overlap in the final report with similar initiatives.

The recommendations also included a list of tasks and information required to support the final report. Feedback from the initial executive summary required further clarification of the proposal and it was agreed to reassess these tasks following the distribution of the draft report

### **4.0 ASSESSMENT**

This assessment has built on previous visits and reports on the SNNPR Water Resources Bureau. To best utilise past work and reduce duplication some detailed evidence and analysis in this report has been lifted fairly directly from two previous reports namely “Implementation of Universal Access Plan (UAP) in SNNPR: A Case Study” (Mengistu et al Feb 2008) and SNNPR Background Information. The contribution of these authors is gratefully acknowledged.



The assessment consists of a detailed report on previous and current findings, including recommendations to enhance monitoring of water resources, improved asset management, human resources capacity building, financial budgets and business planning, together with options to develop the corporate skills and policies to ensure that the service is able to deliver against its objectives, the UIP and MDG. These are presented in the sections below.

#### **4.1 BACKGROUND**

##### South Nation, Nationalities and Peoples Region (SNNPR) - Background Information

The Southern Nations, Nationalities and Peoples Regional State (SNNPRS), consists of 13 Zones and 133 Woredas (including 8 special Woredas) based on the ethnic and linguistic diversity. It is the southern most region of Ethiopia, bordering with Kenya in the south, the Sudan Republic in the south-west, Gambela region in the north-west and Oromiya region in the north and east. The region has approximately 3634 Rural Kebelles and 90 towns with municipality status (Bureau of Finance and Economic Development - BOFED, 2006). The total land area of the region is about 110931.9 sq. km which represents approximately 10 percent of the total area of the country.

The population of the SNNPR, according to CSA projection in June 2005, was approximately 14.5 million (7.2million male, 7.3million female). This represents approximately 20% of Ethiopia's total population. The Demographic and Health Survey (DHS) results of 2005, showed the following demographic statistics for the region (BoFED 2006):

Birth rate	42.6/1000
Infant Mortality Rate	107/1000
Child Mortality Rate	157/1000
Crude Death Rate	13.4
Life expectancy (male)	51.35 years
Life expectancy (female)	53.45 years

SNNPR region comprises approximately 56 ethnic groups. These ethnic groups can be divided on the basis of Cushetic, Omotic, Nilo-Saharan and Semitic super language families. The largest of these are the Cushetic and Omotic groups



Mengistu et al (2008) state the “*annual average population growth of the region as 2.9%. 49.1% of the population is said to be productive (15-64 years old) of which approximately 2.3 million or 22% are farmers and pastoralists. The level of dependency ratio in the region is about 96.5%. Average family size in the region is 5.4 persons per household (CSA,2005). The average population density in the region is 117 people per square kilometer, where the highest density is in Gedeo zone (536 person/km<sup>2</sup>) and the lowest is in Omo zone (18 person/km<sup>2</sup>)*”.

#### **4.1.1 BRIEF HISTORY AND OVERVIEW**

The Southern Nations Nationalities and Regional State (SNNPRS), is one of the nine regions that form the federal state Ethiopia. The regional capital is Awassa, which is about 275km from Addis Ababa, the capital city of Ethiopia. The SNNPR Water Resource Bureaus offices are situated in Awassa.

There have been significant changes at all levels in the organisation of the water sector over the past 50 years. In summary, the changes have comprised the following.

- 1956 Establishment of Water Resources Department (part of Ministry of Public Works)
- 1992 Establishment of Ministry of Natural Resources (included water administration as part of mandate)
- 1995 Establishment of Ministry of Water Resources (included 5 Departments to cover its functions: Water Development, Water Resources, Works Construction Enterprise, Water Well Drilling Enterprise and Water Work Design and Supervision Enterprise)

In 1995 the government adopted a decentralized strategy and the overall responsibilities of water supply and sanitation were transferred to the regional governments. (Mengistu et al, 2008)



#### 4.1.2 SNNPR WRDB MANDATE

The ability of the SNNPR WRDB to deliver the mandate is a key question, together with how appropriate the mandate will remain if any changes are made to the WRDB role

The water resources development bureau of SNNPR has been given wide-ranging mandate, which include:

- Study, design, construct as well as supervise the quality of potable water and small and medium irrigation scale facilities;
- Potable water facility management and maintenance as well as organizing users and training provision
- Conduct survey on the region's resources (for drinking, irrigation, electric power, aquaculture etc) and provision of training accordingly.
- Provide license and credentials to those that participate in water, energy and mining sector development. They include the consultants and contractors and are in accordance with the power vested on it from Ministry of Water Resource.
- Supervise and approve the standards of potable water
- Conduct survey on how to develop rivers for electric power sources
- Undertake legal contract agreements to implement water works
- Protect water sources and water bodies from industrial pollutants
- Decide water fee prices , collect water use and water work related fees
- Renew or cancel licenses issued by the bureau.

The following mandates, although not presently under the bureau, are required in order for the bureau to effectively render its services:

- Ascertain and supervise professionals and contractors that participate in water and related activities in the region
- In collaboration with Finance and Economic Development Bureau. coordinate and supervise NGOs working on water resources
- License and supervise off grid (1000-60,000 voltage) electric service provision, in addition to the already stated mandate of the Mining and Energy Agency stated in the Electric power proclamation of 1990.



It may be appropriate to break the mandate down into core elements that a water supply organisation would be expected to deliver, to clarify and define roles and accountability:

To Develop, Manage and Control Water Resources within the SNNPR at Economic Rates including:

- Installation, Maintenance and Security
- Distribution and Billing
- Service, Quality and Performance
- Strategy and Policy
- Research and Sustainability

Together with reviewing the bureaus mandate with regards energy and mining sectors

#### **4.1.3 SNNPR WRDB – STRUCTURE**

The SNNPR WRDB is structured around the six core departments of Planning Contracts, Water Resources, Water Supply and Sanitation, Operation and Maintenance, Water Desks and Community Participation and Training. Appendix 5 shows the high level structure and the relationship with other mandated sectors of Irrigation, Energy and Mining. An analysis of resource and skills within the Water and Sanitation business are also shown in appendix 5

#### **4.1.4 SNNPR – ENVIRONMENT**

Mengistu et al (2008) identify the relationships within the Water and Sanitation sector between Federal and Regional administrations. At Federal level, the Government has developed Regional Implementation Guidelines for the Water Supply and Sanitation Programme. This includes Regional Implementation Manuals and all associated documentation (forms, model contracts, model terms of Reference, etc.). The World Bank uses these standard procedures to guide the implementation and funding of the national Regional Water Supply and Sanitation (RWSS) Programme through the local government structures. The plan is that in future, other donors will adopt these institutional structures and implementation manuals in order to standardise their own intervention. These guidelines are very important because as Mengistu et al (2008) go on to explain they “*identify roles for the different players: MOWR, MOH, MOE the Regional Water Bureaus, Regional Health Bureaus, Regional Bureau of Education, Regional Rural Development Bureaus, Woreda Water Desks and Woreda Support Groups,*



*communities and Local Service Providers, including NGO's, artisans, consultants and contractors. It gives prominences to the role of women in water supply and sanitation service provision and requires their participation in the Water Committees and Water Boards. In fact, 3 out of 7 members of Water Committees (Washcos) are required to be women. The sanitation and hygiene education will use the methods, publicity and training materials developed jointly by the Ministry of health and UNICEF for scaling up".*

One of the fundamental policy objectives is to push the responsibility for implementation of the water supply and sanitation program in SNNPR to the lowest possible level of stakeholder involvement. In this decentralisation process, *"the technical support provided by the regional level government and non-government organizations has paramount importance"*. Certainly in general terms at least, it appears that at present, the administrative levels below the regions could not cope with policy implementation by themselves.

#### **4.1.4.1 SNNPR – WATER RESOURCES ENVIRONMENT**

##### South Nation, Nationalities and Peoples Region (SNNPR) - Background Information

*The source potential for water supply, both urban and rural, relies heavily on ground water abstracted from springs, shallow and deep ground water aquifers. Although the degree of availability at close range, cost, and quality may vary from one place to another, the potential for water supply sources is mostly available. The challenge is where to locate it so as to minimize costs and provide reliable services at close range.*

*In SNNPR, the present state of development of water supply and sanitation is at a low level. This is further compounded by services that do not meet the minimum standard (BoWRD, 2004). The water supply and sanitation coverage of the region was 20% in 1994/'95 (1987 EC) In the first five year plan (1988--1992 E.C) the coverage was raised to 45% in the rural, and 60% in the urban areas (BoWRD, 2007). However, recent documents (2006/'07) of the Regional Bureau of Water Resources indicate that as of the year 2006, the average regional water supply coverage reached to 54% (urban: 64% rural: 49%). When seen across zones, Wolyta, Sidama, and Gamo Gofa having 62, 61 and 58 percent respectively lead the potable water coverage. On the other hand, keffa and Dawro zones with 29 and 30% coverage are happened to be in their worst status,*



as per the year 2005 data (Appendix 4).

*Apart from this, the physical inventory data indicates that there are 1304 hand dug wells, 1678 shallow wells, 421 deep wells, 2686 Spring developments with distribution points and 255 Springs with net work distributions were constructed in the past years plan and 6953649 people are benefiting from the schemes ( BoFED, 2007). Today, the main actors for WSS in SNNPR are the Bureau of Water Resources, the Health Bureau, the Education Bureau, BoFED, and the Women's Affairs Bureau. Recently, upon the introduction of UAP, a memorandum of understanding on water and sanitation program was signed among five major regional level institutions; namely; BoFED, Health Bureau , Bureau of Education, Regional level Women's Affairs, Water Bureau with financial assistance from the government". It is not clear as to how reliable these records are and importantly whether or not these improved sources are operational or not.*

#### **4.1.4.2 SNNPR – FEDERAL ENVIRONMENT**

Mengistu et al (2008) provide a very useful summary of the roles and responsibilities of the different levels of administration [some modifications have been made to the language of this section to aid understanding]

*"i. Ministry of Water Resource at Federal level: Responsibility for policy and strategy development for the water sector is with the Ministry of Water Resources (MWR) at the federal level. The MWR coordinates external agencies for sector finance, and is responsible for introducing a sector-wide approach (SWAP) by developing the WSS Sector Development Program. With the increased responsibility of regional governments to ensure service provision, the role of MWR is also to ensure effective monitoring and evaluation and provide technical and capacity building support to regions. In urban areas the federal government is also responsible [for the implementation of appropriate] economic regulation of the sector.*

*ii. Water Resource Development Bureau at Regional levels: The responsibility for ensuring the provision of WSS services is lodged with the Regions and Woredas. Regional Water Bureaus are responsible for the overall WSS activities within regional governments. The RWB is charged with providing technical and financial (for capital investment) support to Woredas. Water Departments at the Zonal level are also responsible to support development,*



*implementation and regulation of WSS activities in their respective area. Their role in regulatory functions is, however, not very clearly stated.*

*The water resource, minerals and energy bureau was formed according to the proclamation number 3/88 which specified the mandates of the regional executive bodies. The bureau was re-established based on the revised regional constitution proclamation number 35/94 and the water resources management policy and strategy according to proclamation number 64/95 article 28 as a water resource development bureau. Recently the irrigation sector [was] added to the bureau in November 2005 (1998) after the third regional council meeting. The following are the main objectives of the bureau,*

- To enhance the proper utilization and conservation of the water, mineral and energy resources of the region.*
- To provide safe drinking water for the community and managing the schemes*
- To undertake small and medium scale irrigation study, design and construction quality control.*
- To carry out mineral and energy explorations, development and promotion of appropriate technologies”*

*Appendix 5 is taken from Mengistu et als Case Study and shows that “the Water Resources Development Bureau has 2 Sectors and an Agency namely; Drinking Water Supply Sector (DWSS), Irrigation Development Sector (IDS) and Mines and energy agency (MEA). According to the new structure drinking water sector has three departments: (1) Water Resources Development (WRD), (2) Water Supply Study and Design (WSSD) and (3) Operation and Maintenance (OM); the irrigation sector has two departments: (1) Irrigation Work Study and Design and (2) Irrigation Construction Quality Control; and the Mines and Energy Agency has two departments: (1) Mineral Resource Development and (2) Energy Department. There are other units such as (1) Urban Water Service Improvement, Community Participation and Training Service and (3) Planning and Civil Service Reform Service and (4) Pool Centre which are directly accountable to the Bureau head. There is also one Pool Centre to support the activities of the different sectors in the Bureau.*

*iii) Woreda Governments: The responsibility for ensuring the provision of WSS services at grass root level relies on the Woreda Government. Within the decentralization process in the*



sector, the woreda water office is responsible to plan, implement and evaluate WSS activities in the respective area. Due to the lack of human resource[s], the office is also expected to collaborate with Woreda education and health offices, especially for sanitation, hygiene promotion and small water schemes.

iv) *Kebelle level committee (local government): The kebele council is responsible for the mobilization of community contributions in cash or in kind for development project. In most of the kebelles, a committee called ‘WASH’ is established with a major role of coordination scheme development of its operation and preventive maintenance. Because the WASH Committee [has no legal status], it has restricted ability to access fund[s] and effective financial management. In most of the cases, the members of this committee (where women account about 40%) are elected by the community (the prime beneficiaries) in which the Woreda water office is responsible to facilitate the election and provide technical assistance.*

v) *Regional Health bureaus: The regional health bureaus will be the principal drivers of sanitation and hygiene promotion through their existing institutional mandates but working hand in hand with water and education bureaus to ensure integrated planning and coordinated complementary activities. Their work will focus on strengthening Woreda capacity and commitment through; Woreda mobilization, advocacy, capacity building, research, monitoring and evaluation, planning, resource mobilization and support the development of sanitation and hygienic promotion technical manuals as well as guidelines for regulatory frameworks (with systems for enforcement). They will also be responsible for quality assurance.*

vi) *Woreda Health Desks: The Woreda administration is the key body to spearhead sanitation and hygiene promotion throughout the Woreda and to ensure targets set are achieved. The Woreda Health Desk will take the lead but work closely with the water, education and rural development desk. Under the programme, the Woreda Health Desks assisted by two Health Extension Workers in each Kebele and by two Village Health Motivators (volunteers) in each village will be responsible for the hygiene and health education campaign as well as social marketing and generating demand for sanitation. Many WHDs have required capacity and there are on going programs to increase capacity in the remaining WHDs”.*



Appendix 5 shows that the Regional Water Resources Bureau (WRDB) divides its Drinking Water Supply Sector responsibilities into three areas namely Water Supply Study and Design, Water Resource Development and Operation and Maintenance. There is also an additional independent section termed 'Urban Water Services' which, as the name suggests, deals with urban issues and which reports directly to the Bureau head.

In summary the Water Sector in Ethiopia is divided into the following institutions at the different levels

Federal	Ministry of Water Resources
Regional	Water Resource Bureau
Zonal	Water Resource Department
Woreda	Water Resource Desk

At the village level, the Water and Sanitation Committees (Washcos), while they do not at present have any legal status, are the lowest implementing body. Regional WRDB staff have advised that legal recognition for the Washcos has been proposed and is going through the appropriate approval channels.

The provision of water supplies to cities and major towns also involves the Municipal Administrations.



## 4.2 PRESENT RECOMMISSIONING AND MONITORING CAPACITY

The responsibility for the evaluation of the performance of the Regional Water Resources Bureau against its various targets lies with the Department of Planning and Programming. Beneath the Regions, the Zones and Woredas are also responsible for monitoring of their own activity. As a relatively independent body, the Bureau of Finance and Economic Development also has an audit role.

Mengistu et al (2008) report that the problem with the self evaluation by the WRDB is that it “*lacks clearly stated indicators*”. This issue is recognised by WRDB staff. It became clear in a survey undertaken for the 2008 case study that different staff used different indicators indicating “the lack of universally agreed indicators”. The most common physical indicators included number and types of water points constructed, number of non functional schemes, total population served and number of schools with newly developed water source. These are all simple physical indicators and it was recognised that the “*lack of impact and community based indicators was a limitation of the evaluation system*”.

Other problems with the existing monitoring and evaluation process included the variable frequency of collecting and reporting indicators and the “*lack of standard M&E format*”. Lack of interdepartmental communication may also be an issue as the case study observed that “*though the planning and program department claimed that there is recently prepared evaluation and monitoring format, the majority of respondents reported the opposite*”.

There also appears to be inconsistency in terms of reporting lines between the various levels so that:- “*Though the reporting system for evaluation and monitoring is as per the institutional arrangement some Woredas are also expected to report directly to their donor agencies; UNICEF supported Woredas were mentioned as examples here*” and again:- “*Critical confusion has also been witnessed in the role of [the] Zonal Water Resource Department in the reporting system; some Woreda Water Offices report directly to [the] regional office while others report through [the] Zonal Department*”.

Distance and access problems are also cited as problems with reporting in the more remote Woredas. Other restrictive practices were found to include an informal feedback system (if any at



all!), lack of an organisational culture and delays in the analysis of data.

The SNNPR Case Study by Mengistu et al (2008) also considered the monitoring and evaluation procedures adopted by non government organisations (NGOs). The tendency here seems to be that evaluation comprises baseline and end of project surveys carried out by the head office or external consultants. As with the government institutions BoFED may also be involved on request in the “*terminal evaluation process*”. Perhaps surprisingly the case study identified that similar problems were evident with some NGOs (though with significant exceptions) as in government institutions. So the report claims that “...NGOs [were] also found to suffer from similar problems [to] the government sector. This includes lack of clearly stated indicators (with some exceptions like IRC and Water Aid), lack of standard monitoring, evaluation and reporting format, and non existent feedback system”. The reporting systems between the NGOs and Regional Water Bureaus were found to be less than adequate so the NGOs “*universally lack established system[s] to report their activity to regional water bureau*”.

Under operational guidelines for government and non government organisations NGOs should submit an annual action plan and quarterly reports to the Bureau of Finance and Economic Development. In practice this reporting is often irregular and late. “*For example out of 42 WSS projects being carried out by 21 NGOs since 2005, only 5 (11.9%), 1(2.3%) and 6 (14.2%) submitted their 2005, 2006 and 2007 operation plans, respectively. Similarly in 2007, 26 (50%) have not submitted any of the four quarterly reports while 12 (28.5%) sent only one of their quarterly reports*”.

In the light of the preceding details Mengistu et als’ case study identified 7 distinct problems with the existing monitoring and evaluation procedures:

1. *Lack of clearly stated indicators among nearly all stakeholders,*
2. *Lack of standard reporting and monitoring format among nearly all stakeholders,*
3. *Absence of clearly indicated time frame to carry out evaluation and monitoring*
4. *Presence of critical confusion on the role of Zonal Water Department in evaluation, monitoring and reporting systems,*
5. *Absence of established feedback system within all stakeholders*



6. *Weak reporting link between governmental and non governmental organizations*
7. *Lack of awareness on the side of BoFED even about the presence of the UAP program, especially in the Monitoring and Evaluation Department (Mengistu at al, 2008).*

The preceding work shows that there are clear issues over monitoring, evaluation and reporting. What is less clear is the type of monitoring data that is collected. It is assumed that a lot of the monitoring and evaluation is (rightly) concerned with the success (or failure) of the overall project in terms of community participation, health benefits etc. There seems to be less in terms of the measurement of physical parameters concerning the source itself. For example, is the well still producing what it did in the past, are water levels dropping, is the pump about to fail etc. As will be considered in more detail later on this area of monitoring is vital in terms of re-commissioning of improved sources.

#### **4.2.1 Regional Water Bureau Technical Capability**

The previous section reviewed the February 2008 Case Study findings in terms of reporting lines and structures. Also of great interest to the subject of re-commissioning is the availability, appropriateness and condition of the equipment or material resource of the Regional Water Bureau. Once again Mengistu et al have looked in detail at this and their work provides a very useful summary of the present condition of the maintenance capability of the WRDB.

*“The list given below [Figure 4.1] does not include resources like office equipments and computers. Even though the operation and maintenance department of the Regional Bureau is expected to cover the demand of construction and major maintenance of schemes for the entire region, it has limited and old machines/equipment to satisfy the request of [the] Woredas. In addition, due to lack of allocated budget, the department [does not have sufficient] numbers of machines and equipment”.*

**Figure 4.1 Material Resource of the Regional Water Bureau, Operation and Maintenance Department.**

No	Type of the material resource	Quantity	Remark
1	Heavy-duty mobile workshop	4	
2	Rehabilitation Rig	2	
3	Drilling machine	1	
4	Crane	4	1 not functional
5	Vehicles		
	IVECO	1	
	HENO-CAR with well equipped garage	4	
	Light vehicles	2	
	Toyota car	3	
	Land rover car	1	





### 4.3 EVALUATION

The major policy pillar for the Water Sector is the need to decentralise responsibility down to the lowest appropriate levels. It seems to be the Woredas that are expected to be the major implementing level. It is clear though that as Mengistu et al point out “*The major threat [to] the water resource sector is shortage of manpower and staff turnover; [the problem is especially prominent] at Woreda level where most of the activities are expected to be carried out*”. These human resource issues are partly due to access issues in that “*the qualitative study indicated that only towns located on the major road sides have adequate human resource*” and partly due to management issues “*The main reasons for the uncontrolled staff turn over were reported to be lack of incentives, seeking for better working environment and payment*”. It is not surprising that staff will want to better themselves and look for career opportunities. This is something that the WRDB must grapple with.

The private sector could be an extremely important aspect of the Ethiopian water sector however there are problems. There are at present very few reliable and experienced private companies offering water services particularly in this region. Most of the private sector are described as “*inexperienced, inefficient, and time insensitive*”. In general the private sector is also very expensive due to the high investment cost involved in water schemes construction.

Mengistu et al also note that “*The other threat is that although there is trend of increasing budget allocation from the side of the government there is a tendency to leave the major share of Water and Sanitation sector budget to be covered by donors which may create donors dependency and affect sustainability of the system*”. However, in general because of the way that NGOs are funded there will be a tendency for their funding to be targeting in relatively straightforward and simple water supply schemes where the degree of technical difficult is not great. So for example areas of low groundwater levels and poor groundwater quality will not be so attractive to donor organisations. Alaba special Woreda is cited as an example of this. “*the water table in the area is so low and water from these sources has got high fluoride content. This has incurred high treatment cost and NGOs are restricting their intervention to fluoride-safe areas*”.



#### 4.3.1 Challenges of Water Supply and Sanitation activities

In summing up Mengistu et al (Feb 2008) cited the following challenges in the area of water supply and sanitation.

- *Shortage of governmental budget at all level[s] of the system especially at Woreda level.*  
As a result although there is a structure which allows for the employment of professional positions at Woreda level, they cannot be filled. One of the knock on effect is that the capacity for financial management at Woreda level means that funding allocated for the Woredas is held at Region and does not work its way down. An example is given from Alaba special Woreda where “*the capital budget allocated from the region in 1998 for defluoridation of water sources has not reach[ed] to the Alaba Special woreda*”.
- *Zonal and Woreda level planning is not carried out in integrated manner among the primary partners.*
- *Donors’ preconditions and modalities hinder and delay implementation of WSS activities. This includes protracted international purchasing and recruitment process, requirement for employing professionals from specific courtiers, conditions for new evaluation system and organizational structure etc.*
- *The manpower resource at Zonal level is under-utilised [because] the role of the Zonal department in the sector, in [the] budgeting, planning and evaluation process is not clearly [defined].*
- *The appointment for Head of Zonal Water Departments and Woreda Water Desks is neither political nor merit based. This has limited their participation in decision making on important issues such as budget allocation of the sectors and approval of annual plans, since they are not the members of the Zonal/Woreda cabinet as other political appointees.*
- *Poor information and documentation systems.*
- *Technological challenges including difficulty to get spare-parts for schemes constructed by NGOs since most of such organization use their home country brand to construct facilities.*
- *Funding challenges including difficulty to convince donors and to access funds for [longer term periods] since some funds are only available for few months,*
- *[When working with] non governmental organizations, governmental workers expect and claim special benefits and incentives to be involved in bilateral projects,*
- *Prolonged procurement and financial system of the government,*
- *Poor infrastructure, specially road and transportation in remote areas of the region,*



- *Competition and lack of coordination among NGOs,*
- *Sustainability problems due to beneficiaries lack of awareness and concern [for] schemes,*
- *Some local NGOs have limited human, material and financial capacity to implement sustainable WSS programs. While other have high overhead cost which takes the lion share of the total budget.*
- *Lack of material resources like vehicles, motors bicycles, computers and spare-parts etc*
- *WaSH committees lack legal entity which creates serious challenges to financial accountability and controlling.*

#### **4.3.2 EVIDENCE**

The Ethiopian Federal Governments Universal Access Plan (UAP) plan is over 7 years (2005 – 2012) and aims to raise potable water supply coverage in the SNNPR to 85%. The United Nations Millennium Development Goals (MDG) have an end date of 2015 from their adoption in 2005. These have set the context of water resources policy in the regions. On the basis of these the SNNPR WRDB instigated a 5 year Strategic Plan (2005 - 2009).

The specific targets for access to potable water supply under the UAP are:

15 litres/person/day at a distance of 1.5 km in rural areas

20 litres/person/day at a distance of 0.5 km in urban areas.

To meet these targets the SNNPR strategic plan involves new construction, rehabilitation of failed schemes, up-skilling of human resources and identifying funding streams from donor agencies. There is an annual target of 6% increase in coverage within the region. This has involved (according to South Nation, Nationalities and Peoples Region (SNNPR) – Background Information) *“the construction of 1534 hand dug wells, 2791 spring development, 4516 shallow wells and 553 deep wells will be constructed with a total of Birr 730,321,000. In addition 161 hand-dug wells, 428 springs, 237 shallow wells, and 53 deep wells with a total of Birr 106,402,500 will be rehabilitated”*

Taking into account the constraints outlined in the previous section above which include administrative, financial, technical, monitoring and evaluation and human resource issues it would appear that the goals of the strategic plan present a significant challenge. Some very specific and



fundamental management issues need to be addressed. It is the purpose of this report to highlight some areas that should be considered in terms of capacity building. It is always possible to point to problems and constraints but less easy to identify workable solutions. It is hoped that taking an objective view from the outside but with the benefit of experience in monitoring and maintenance in the UK that PAWS can assist the SNNPR WRDB to meeting some of the challenges that it faces.

## **5.0 RECOMMENDATION**

The recommendations presented in this report come from the contact that PAWS has made with the Regional SNNPR WRDB and further information collected by PAWS representatives as outlined in the previous sections. The aim of the recommendations is to build on the work already being done by the WRDB and to assist in building all aspects of capacity at the most appropriate levels.

The SNNPR Water Bureau has a challenge in developing an effective re-commissioning strategy for potable water sources that for various reasons have gone out of commission. The reasons for their failure are numerous and include anything from the failure of a small replaceable component of a hand pump, the malfunction of a sophisticated generator, the drying up of a well or spring due to lack of recharge. The components of developing a re-commissioning strategy includes knowing what the asset is, understanding why it has failed and how, or indeed if, it can be fixed and having trained staff and reliable, appropriate equipment at the lowest appropriate level to be able to fix and re-commission it. In the SNNPR many of the failing schemes are in remote locations, in these cases it is vital that wherever possible local people and equipment (i.e. at Kebelle Washco level) are available to remedy most failing, all except the more complicated problems. Where the solutions to faults are too complicated for local artisans then it is vital to have suitably trained staff and appropriate equipment available at the lowest appropriate structural level above that. This is a fact well understood by the Regional Water Resources Bureau who are keen to push the responsibility for re-commissioning down to Woreda and Kebelle level. True responsibility must however lie where the appropriate level of skills and equipment reside. Hence it is not sustainable to push down responsibility to the local level (e.g. Washco) while holding the key staff and equipment at a much higher level (e.g. Region).



## 5.1 THE WAY FORWARD

The initial visit and further research that the authors of this report have carried out has shown that there are many skilled and dedicated staff in the SNNPR WRDB. There is a genuine desire to move forward, to acknowledge the difficulties and respond to the challenges of providing adequate potable water supplies to 19 million people living within the SNNPR. Many of the problems are understood but the solutions are harder to identify. Whatever strategy is opted for it must be appropriate, practical, affordable and sustainable. Otherwise it will be of increase risk of failure. Given the size of the task SNNPR WRDB have sought partners to assist in moving forwards. As such any strategy must also seek to bring in, at the most appropriate level, the skills and experience of other organisations, educational, health, government and NGO, who are already working in this area and have the relevant skills to assist. The strategy for re-commissioning should be based around the following

- the thorough understanding of the assets involved through the development and use of a suitable asset database
- the year on year monitoring of the performance of those assets though appropriate local hydrometric monitoring
- appropriate training at the appropriate levels to build capacity in these areas
- development of reporting structures that ensure that the right data gets to the most appropriate level to be useful
- identification of the most suitable centres for operational units and staff to be based
- development and management of the links with other initiatives and organizations at the most appropriate level
- the review and definition of the WRDB's operating mandate, budgetary and planning responsibilities
- Increase understanding of the implications of the current transportation and communication routes within the region

### 5.1.1 Technical and Operational Capacity

Underlying the strategy for re-commissioning lies the accepted understanding that most of the work should be carried out by technicians and artisans at Washco or Kebelle level. These people require appropriate training and also must be supplied with the right tools and spare parts to deal with the majority of issues that cause improved sources to fail.



The SNNPR WRDB Head Office is situated in Awassa. Awassa is on the eastern edge of the SNNPR region. At present it would appear that most of the skills, equipment and transport are also based in Awassa. This means that response times for dealing with rehabilitation issues are limited. It is suggested that more localised “centres” should be established. These could be based in the thirteen Zones within the SNNPR region but this would best be decided after discussion and the input of local knowledge. The importance of each of these Centres would depend on their population and numbers of improved sources. The Centres could support the Woredas by being the purchasing and holding centres for spare parts and large equipment that will be required for major repairs, and the ability to access funds and resources .

The overall objective would be to have trained artisans at all Washcos which would be furnished with a workshop equipped with tools and spares to deal with all but the most difficult repairs. A good example of a well functioning Washco is at Meder Genet, Shebedino Woreda, where there is an experienced artisan with a fully equipped workshop and spares and a very effective system of collecting payment for water for funding.

At present JICA are involved in practical training in a number of Woredas within the SNNPR (particularly in the area of handpump maintenance).

The creation of more local Centres above the Washcos would serve to decentralise the re-commissioning responsibilities. It is envisaged that each of these Centres may develop a specialism based on the predominant type of source in their area. For example, lowland areas might expect to have more deep boreholes than wells or springs and so the Centre in those areas would have bias towards dealing with submersible pumps, generators etc.

This comes back to having an asset database that allows planners to understand the proportion of different types of improved source in each Zone and Woreda. This will be discussed in more detail the next section.

Different types of improved source can be expected to have different common problems associated with them. Appendix 6 attempts to categorise some of these. The more predictable the



maintenance the easier it is to manage an effective, cost effective programme it is.

#### **5.1.1.1 Personnel**

The difficulty of getting trained and experienced staff to move away from regional centres is recognized. Yet the best way for theoretically trained Engineers and other specialists to gain practical experience is working in the field at local level. This issue is recognized nationally within Ethiopia and acknowledged by Universities and Technical Colleges. The WRDB provides what should be an ideal environment for providing practical experience to Ethiopian Graduates into the everyday engineering and hydrogeological issues that face Ethiopia today. To do this the WRDB need to look at its structures and graduate training programmes so that new graduates can be practical trained and in turn become trainers themselves. This will benefit the WRDB as well as the Water sector in general in the SNNPR region as the general skill level rises. It should be anticipated that trained, practical specialists may want to move out into private enterprise and this has to be a positive move.

#### **5.1.1.2 Transport**

Transport must be looked at in more detail. The provision of a well maintained vehicle(s) at the lowest appropriate level (probably Woreda) will greatly assist the support of the local Washcos in re-commissioning work. This will help in maintenance activities and offer mobility to men, tools and spare parts. It is recommended that WRDB review its policy in vehicle allocation, and the appropriate vehicle between motor cycles, vans, cars or trucks. This review includes the practicality of the WRDB signing up to a mandate and targets that it is unable to attract the levels of resources and financing to deliver against. This will be discussed later under financing and business planning

#### **5.1.1.3 Pump lifting equipment**

The number of tripods and hoists should be reviewed and strategically located to allow a swift response for the lifting of pumps and rising mains. This is essential for maintenance and rehabilitation. The lack of lifting equipment will seriously hamper any re-commissioning work. Clearly a mobile crane provides a much quicker, less labour intensive method of withdrawing a pump but it is understood that these are limited in number and operational readiness. The precise numbers and the locations of the lifting apparatus should be agreed in discussion with the WRDB.



It is also recommended that flexible rising main could be considered for electric submersible pumps. Constructed from strengthened and durable material this is widely used in the UK. It allows the pump to be withdrawn without the need of hoist or crane as it can be dragged out over a suitable pulley by a small vehicle or even an animal or team of animals. Details of one manufacturer are given in Appendix 8.

## **5.2 Hydrometric and Asset Monitoring**

### **5.2.1 Asset Database**

It is very difficult to maintain any system when there is no/poor data to show how it is performing. So for example, if a report comes back of an improved source that has ceased to work it could be a spring or a well that has dried due to lack of rainfall. It could be a spring that has diverted because the collection tank has been damaged. It could be a well where the pump has failed. It could be a blocked or broken pipe in the distribution system etc.

An asset database is required that stores basic information on each improved water source. This asset data base should be held at a central location and updated when any changes are made to the database, being fully auditable and dated. It is worth emphasising that an out-of-date database is almost worse than none. No-one knows whether or not it is reliable!

The most basic data required is the type of source. Is it a spring, a well or a borehole or some other protected source?

Under type of improved source it is suggested that the following information should be stored.

- Location (Zone, Woreda, Kebele)
- Grid reference
- Date of construction.
- Persons or organisation responsible for construction
- Contact in constructing organisation
- No. of population designed for



- WashCo contact details
- Change register (record dates, reasons and details of any changes for audit purposes)

#### **Well or borehole:-**

- Asset Identification number
- Depth of well
- Geology / Lithology
- Plan of wellhead construction (include photograph if available)
- Method of construction (e.g. hand dug, cable percussion or rotary drilled etc)
- Driller's logs
- As constructed details (including casing, screens, gravel packs, diameters, depths etc)
- Datum (level from which all measurements are taken)
- Static water level at time of construction (metres below datum)
- Means of abstraction (e.g. windlass, hand pump, rope pump, electric submersible pump)
- Details of pump (make, serial number, date of manufacture, rated head and flow)
- Depth of pump suction
- Details of rising main (type (material, flanged/screwed), diameter, no. of sections, lengths of sections)
- Details of initial pumping test (Date, flow rates, static water level, water level drawdown, recovery rates etc)
- Water quality
- Change register (record dates, reasons and details of any changes for audit purposes)

#### **Spring:-**

- Asset identification number
- Geology
- Nature of spring head (single or multiple collection chambers, Collector drain etc)
- Plan of spring head layout and construction
- Yield on construction (Date, total yield and yield of individual spring chambers)



- Water Quality
- Change register (record dates, reasons and details of any changes for audit purposes)

**Distribution system:-**

- Plan or map of system (pipes routes, tank and tap stand locations, water meter locations)
- Pipe details (diameter, material, depth if buried etc)
- Tank details (volume, type, construction material, outlet locations etc)
- Tap stands (no. and type of tap, population served etc)
- Change register (record dates, reasons and details of any changes for audit purposes)

It is understood that in many cases, all or some of these details are not known. In other cases a lot of this information will have been collected and is stored and used. It is considered worth the effort for each Woreda to review and update the asset database along with regional staff. Where any doubt over the validity of this data is encountered, the sites should be visited and the data audited and updated.

These databases should be standardised wherever possible so that exchange of data is straight forward with minimal risk of data corruption in transfer. For ease of access these databases should be in hardcopy format at Kebele level and Woreda level, this may be facilitated by the use of spreadsheet (EXCEL) format being adopted. At Kebele level any changes to the database should be made as soon as any work is undertaken. It is suggested that Woreda staff should audit Kebele records on a regular basis (every 3 months) and update the Woreda database, limiting the risk of the Woreda database become out of date, reducing the issues of having to use project funds and resources to re-write the data each time.

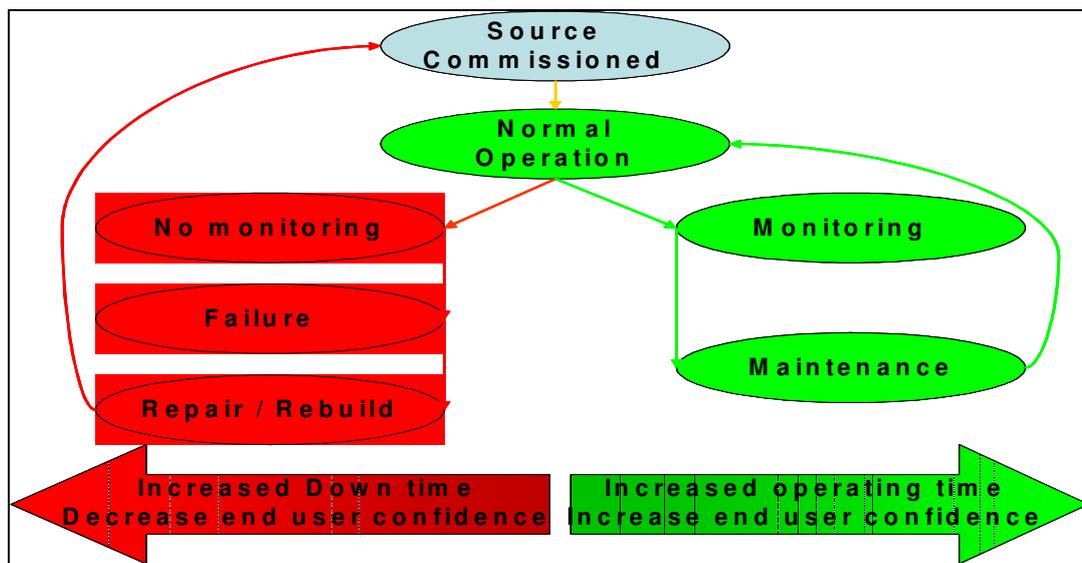
### **5.2.2 Monitoring**

Once the database is established regular hydrometric monitoring of sources should be carried out. It is understood that the collection of this data may represent cultural shift. By necessity it will involve Water Bureau staff but may also draw in members of the public, local schools, clinics

etc. In the collection of hydrometric data accuracy of taking, recording and transferring data is of utmost importance. POOR data is often worse than NO data!

Figure 5.1 shows two possible routes for the life of an improved source. The green circuit illustrates the ideal case where post commissioning monitoring enables regular maintenance that keeps the source operational throughout its design life period. The red circuit shows the situation where no monitoring is carried out, if a problem occurs there is no easy diagnosis because nothing is known of the fault and the source fails. It is not known why the source has failed so a time gap develops until the appropriate people visit the site to diagnose the problem which is then repaired and the source re-commissioned. In this case the population served by this source will have resorted to their traditional water sources and an increase in disease will have resulted.

**Figure 5.1 – Cycles of Maintenance**



Effective maintenance requires data to guide it. This section looks at the type of data that is required, why it is required, what it can be used for and lastly suggestions as to who might be able to collect it.

What data is required?

Simplicity is important and many things can be understood from basic accurate data.



### 5.2.3 Measurement of Water levels

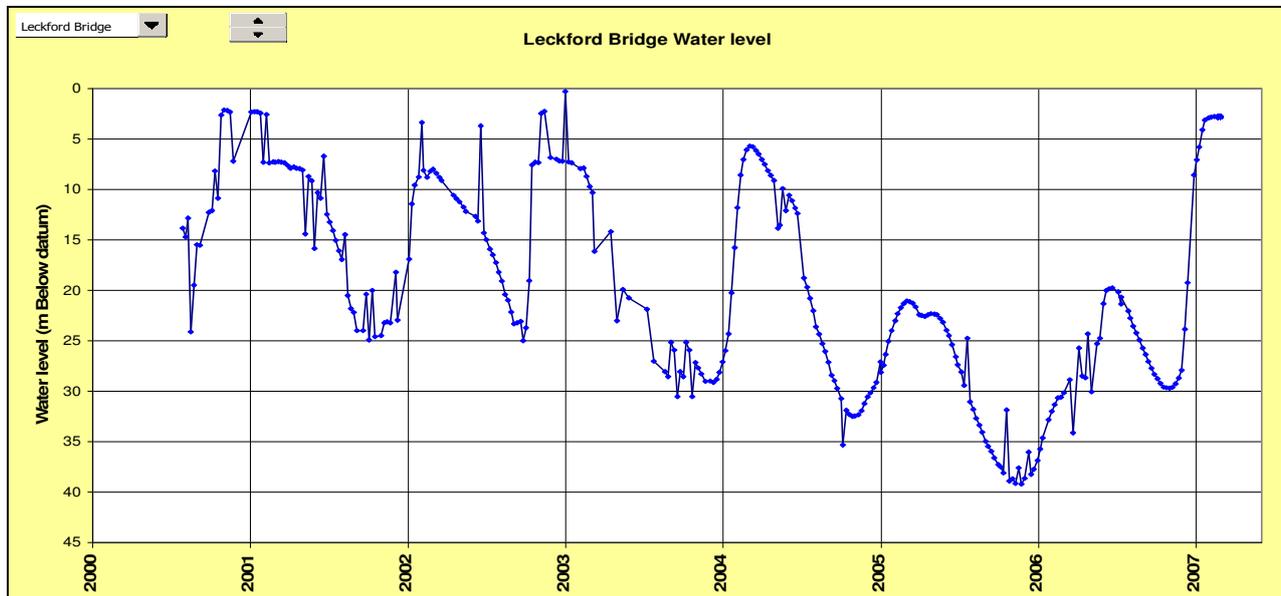
In wells and boreholes water level data is of high importance to allow assessment of performance. This must be measured from a recognised and permanently fixed datum. This could be ground level, top of borehole headplate dip tube etc. In general, it doesn't matter what the datum is but it should be close to the borehole and ideally in a position whereby the water level can be measured straight down vertically from it.

Water level should be measured and recorded in metres below the datum.

The static water level in a non pumping well / borehole is a good indication of the condition of the aquifer. This will change throughout the year so that water levels should be higher in the wet season(s) and lower in the dry season. Static (or non pumped) water levels taken on a regular basis year after year and compared with rainfall records, can help to sort out problems due to lack of recharge (i.e dry or drought years) when levels are naturally low from low water levels caused by other local issues.

Figure 5.2 shows an example of a groundwater level hydrograph in the UK. 2005 and 2006 were dry years followed by a very wet winter in 2006/07. The data reflects these climatic conditions in the groundwater levels. In the absence of any other data, reports of loss of yield from springs, wells and boreholes during this dry period are likely to be due to lack of recharge rather than local factors such as borehole clogging etc.

**Figure 5.2 – Groundwater level Hydrograph (UK example)**

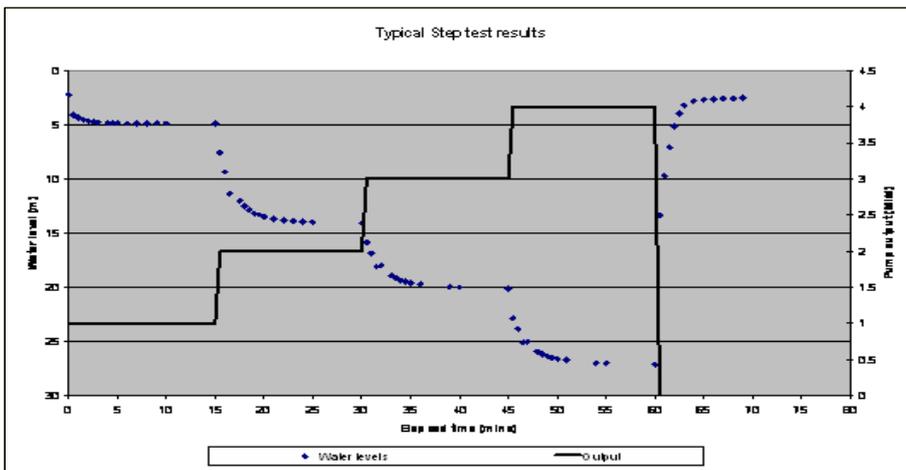


Pumped water levels are also very useful and when looked at in combination with flow rates give valuable diagnostic data about the local issues e.g. clogging of well screens. For example, if year on year pumped water levels are declining while flow rates remain constant, it is likely that water is finding it harder to enter the well / borehole and clogging of well screen or local aquifer can be suspected.

It is advised that where possible simple pumping tests be carried out on individual wells or boreholes. These can be as simple as taken one static water level before pumping starts, pumping the well of borehole for 30 minutes (or less if time does not allow) then taken a pumped water level, stop pumping and then take a static water level 30 minutes after pumping stops.

More sophisticated step performance tests can be carried out on wells and boreholes. In this case the flow rate of the pump is increased at regular intervals while water levels in the same borehole are measured. The results of such a test are given in Figure 5.3. This is probably best done in wells or boreholes that have a mechanical pump as it is very difficult to vary the flow rate of a hand pump in any consistent fashion. The real value of these tests is where they are repeated in subsequent years and if possible during similar prevailing water level conditions. This

**Figure 5.3 – Step Test Results**

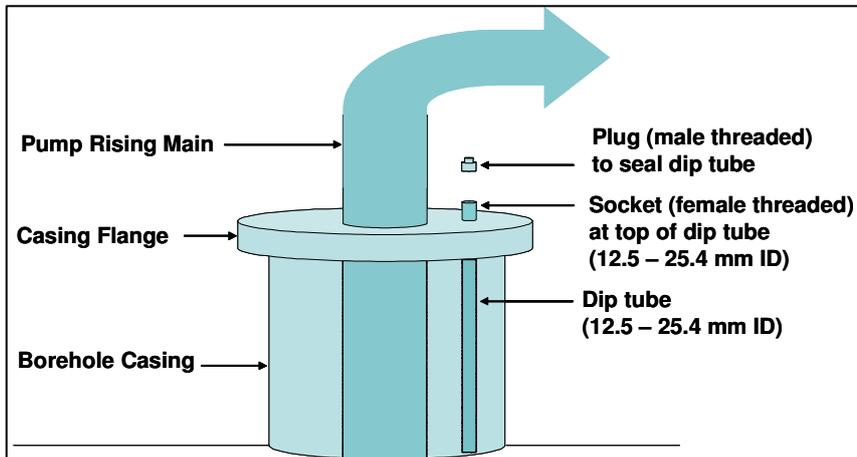


practice can identify decline in performance of wells and yields. Water levels can be measured using a number of different devices. There are water level dipmeters which comprise a probe on the end of a graduated tape. When the probe touches the water an electrical circuit is made

causing a light or a buzzer to go on at the surface. These however, are expensive as they would need to be imported. Much easier is a simple weighted float on the end of length of string or cord. When this weighted float reaches water level the string goes slack. The point at which the weight first comes back onto the string is marked and once the line is retrieved, the length of string (which now indicates the water level) can be measured with a tape measure. Such water level monitoring equipment can be locally manufactured and tape measures should be available locally.

It will be necessary to retrofit some boreholes with access holes through their headplates to allow water level monitoring. This has to be a balance between securing the headplate to prevent objects being dropped down into it or contaminated surface water entering through the top and access. It is often helpful to have a dip tube within the borehole as this prevents the water level measuring equipment from getting tangled on the pump rising main and cables. A diagram of a recommended headplate access tube is given in Figure 5.4.

**Figure 5.4 - Borehole Headplate Showing Dip Tube and Access Hole**



#### 5.2.4 Measurements of flow rates

Flow rates of hand pumps can be measured using a stop watch and a bucket. Higher flow rates for example from electric pumps can be measured using larger containers (200 litre barrels or the storage tank) and a stop watch.

Regular measurement of pump flow rate in combination with water level measurement can help to diagnose declining yield of pumps. For example, if the pump water levels are similar to previous testing but the flow rate is lower (assuming that no additional restrictions have occurred in the delivery system e.g. partially closed valves) then it is likely that the pump needs to be looked at.

Measuring the flow rate from springs is important as it allows assessment of regional aquifer water resources. Year on year monitoring of flows, in combination with rainfall records, can help to separate the causes of yield loss from the impact of climatic condition (lack of rainfall) and other more local causes e.g. blockage of pipes by root growth.

#### 5.2.5 Summary

The ability to manage water supply schemes locally and regionally is significantly improved when reliable, accurate monitoring data is collected at the local level, passed back to the most appropriate central location and stored within an auditable, regularly updated database. This can allow appropriate decisions to be made on the allocation of funding for rehabilitation works, the



areas where additional resources (personnel, training etc) are required and in the case of individual source failure, the most appropriate response.

The collection of data by monitoring water levels and flow rates for wells, boreholes and springs is seen as being of paramount importance in the development and ongoing management of an effective re-commissioning strategy.

### **5.2.6 Who will do the monitoring?**

The creation and management of a suitable asset database will require the input of trained hydrometric personnel at Woreda, Zone or Regional level. A database is only ever as reliable as the data within it and so the management of the data collection network will require expert involvement.

The collection of data must be carried out at a local level by local, reliable personnel. The WashCos are the first line in terms of recommissioning and need to be trained in the collection and basic analysis of source monitoring data to facilitate that task. Ideally these will be dedicated people either within, or selected by and responsible to, the WashCos at Kebele level. It is vital that whoever collects the data understands why they are doing it, what the data means and therefore the importance of regularity and accuracy in the collecting of it. PAWS could assist in the training of local hydrometric data gatherers.

The WashCos will be able to select a reliable person or persons to undertake these tasks. However, one alternative that might be considered is that of using local schools. These establishments represent a long term presence in the community with an interest in the education of that community. Were they to be given the task of monitoring the flows from their spring or water levels in their well or borehole, as well as passing that data onto the WashCo, they could use it as a teaching aid within their curriculum.

Another possibility is where a Health Clinic has an improved source dedicated for its use then its staff may be willing and qualified to take on responsibility for the monitoring of that source.



One resource that SNNPR has in abundance is people. Every day hundreds of people visit wells, boreholes, springs and tap stands across the region. Many of these people will be bright, intelligent individuals who, given the right guidance and training, could take on responsibility for monitoring.

Discussion with WRDB should identify the best placed human resource to carry out this work accurately, reliably and on an ongoing basis. Once these people have been identified short training courses can be developed to progress this initiative.

### **5.3 HUMAN CAPACITY DEVELOPMENT**

The important questions to be raised here are:

- Does the SNNPR WRDB have the required influence and power to deliver against this mandate in the current legal and federal structure?
- What power does it have over water resources, including source protection?
- What power does it have to raise funds and capital to install new plant?
- What influence does it have in the design, construct and commission processes prior to handover?
- What influence does it have to protect the distribution network?
- What influence does it have with regards billing and cash collection?
- Where in the current external structure are the SNNPR WRDB regulated, set target and monitored?
- Are the Strategy and Policy for water supply and sanitation in the SNNPR appropriate and have they been communicated?
- What are the practical impacts on the SNNPR WRDB of the MDG and UIP?
- What are the potential effects from other activities across the SNNPR with capacity development?

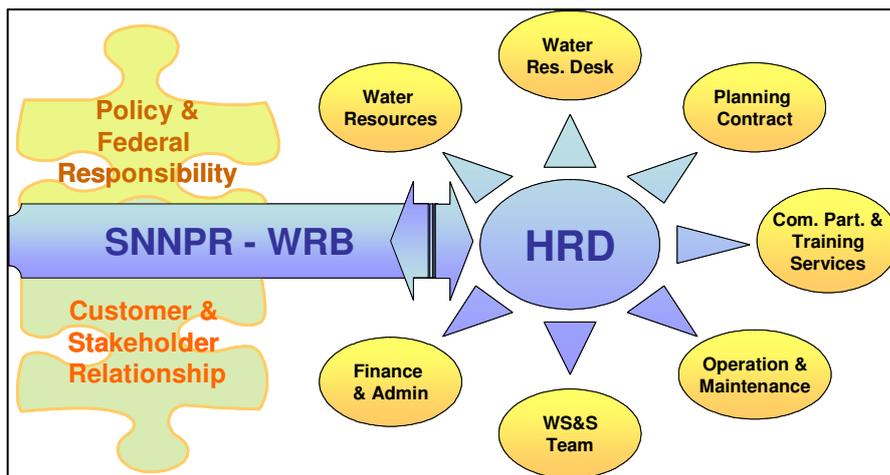
Due to the potential complexity of some of these areas it is recommended that the SNNPR WRDB challenge is broken down into four core business themes.

Core Business Themes:

1. Policy and Federal Responsibilities
2. Customer & Stakeholder Relationships
3. Technical and Operational Capability
4. Human Resource Capacity Development

Looking at external influences, the themes of Policy and Federal Responsibilities and Customer & Stakeholder Relationships will shape the focus of departmental roles and accountability

**Figure 5.5**



Each of these business themes will involve a cross section of WRDB management and staff, a range of stakeholders and a variety of skills to meet the challenge ahead. Although, these themes are not mutually exclusive, there are benefits from moving each forward at their own pace.

Examples of benefits from moving each theme forward independently:

- Some themes could be delayed by need to change Federal legislation
- Customer Relationship issues could highlight technical and operational requirements
- Increased human capacity may support increased federal responsibility
- Operational demands may highlight human capacity requirements

Most important is that the SNNPR is already promoting improvements across the organisation. It is imperative that these initiatives are included within a structured programme, to give focus to activities, maintain motivation and passion, while removing duplication and the risk of initiative overload

**Figure 5.6**

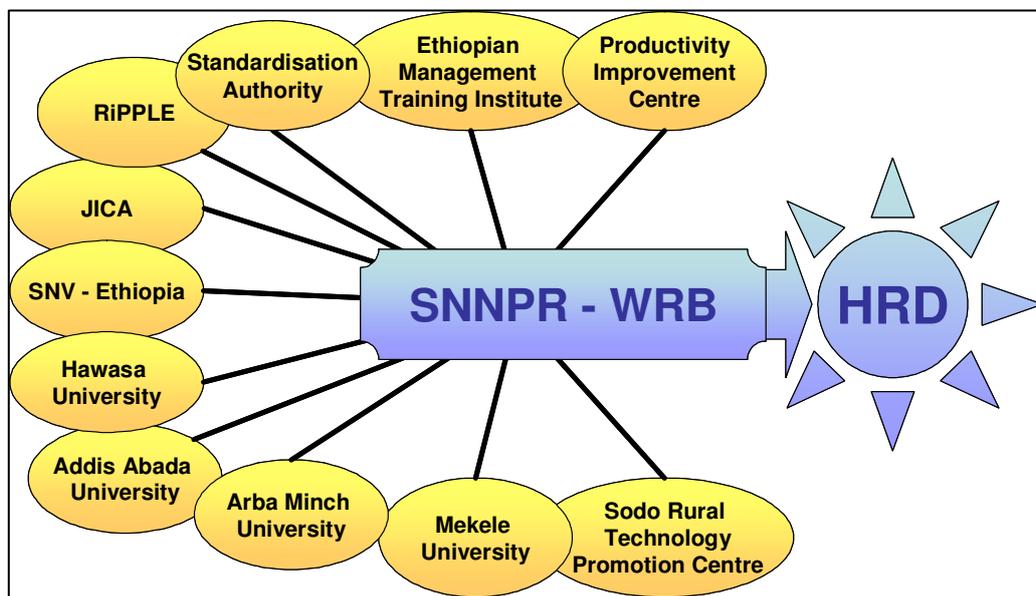


Figure 5.6 illustrates the number of agencies and organisations that can/are assisting and influencing the tasks of the SNNPR WRDB. The relationship between SNNPR and its stakeholders is important and valuable. The key issue here is how the WRDB coordinate these relationships to harness the expertise within, in order to deliver the UAP and MDG target and their own Strategic Plan. The PAWS visit in March 2008 highlighted that many of these organisations (which are effectively customers and suppliers) are interested in being involved. The WRDB provides a unique opportunity for many these organizations in different ways. The academic institutions are looking for opportunities to give their students field experience with practical application of their training. There is no shortage of work within the WRDB remit and they need to be able to key into these relationships could greatly assist the Bureau. There is a need to develop capacity within the WRDB to effectively manage and supervise in this area to maximize the use of resources.

Figure 5.7

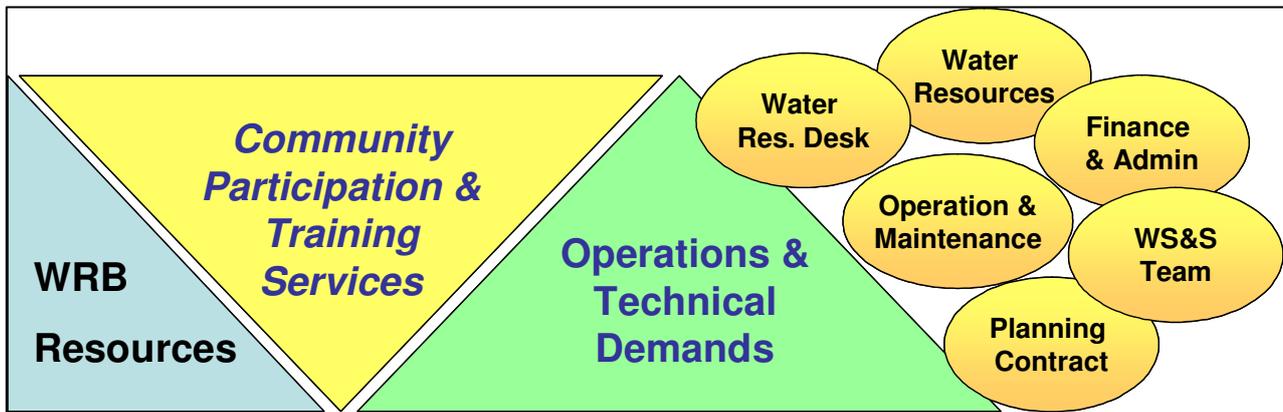
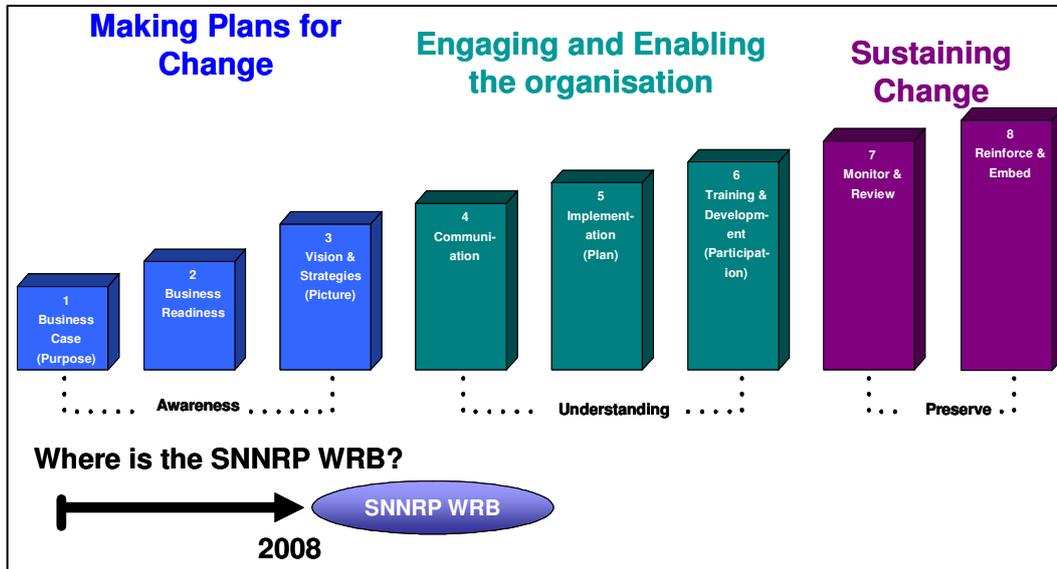


Figure 5.7 represents the core components round which operational and technical capacity would be developed. The key focus for the WRB will be to identify its required objectives for HRD within the business themes, and then identify potential gaps within the WRB Resources to be training. The WRB Community Participation and Training Team or appropriate resources will act as trainers the operational and technical requirements. PAWS can offer assistance to the WRB in developing scoping and material to building the human resource capacity across these areas.

The development of human resources skills within the WRB and the help of partner organisations with be key to achieve the water supply and sanitation targets and provide easy access to potable water to its 19 million population. The right people with the right training and experience must be in the right place to translate Policy and Responsibility from the Federal Government into on the ground delivery at Village and Kebele as the WRDB moves towards sustainable business improvement.

Figure 5.8 illustrates the stages that an organisation moves through towards being able to adapt and respond to its changing business environment. Highlighted is our opinion of where the SNNPR WRB is current on the process to being able to sustain change. This is the phase to transfer awareness into understanding and action to engage and enable the organisation. It will be important that the WRB communicates to staff, customers and stakeholders why and how the business is planning to meet it's obligations, it will need to develop achievable implementation plans and clearly identify training and development plans

Figure 5.8



There are no short cuts to the embed these cultural changes into an organisations, although the benefits of building on solid foundations, visions and strategies, supported by strong leadership and clear communications will greatly enhance the organisations route to success.

#### 5.4 FINANCIAL BUDGETS AND BUSINESS PLANNING

One of the core themes that has run through the work carried out within the SNNPR WRDB, together with other work in Africa is the availability of finances to support the human resource and capacity building

There is no magic formula to attract funding, and it is the cornerstone of any organisation whether it is a government or non government organisation, a commercial entity or not for profit all have to understand the business plan they are running against and their ability to fund these activities

The SNNPR WRDB has taken on a mandate covering Water Supply and Sanitation, Irrigation, Energy and Mining, with wide ranging accountability for the provision of water services, quality and control within the region.

It is recommended that the WRDB carries out a detailed review and SWOT analysis of its business and budgets to fully understand it's ability to deliver against this Mandate, and at the



same stage to carry out a STEPLE (Social, Technical, Economic, Political, Economic and legal) review to support it's business plan for the next 3-5 years.

The business environment and the water sector globally is undergoing change, improvements in communication via internet, email and phones has developed hugely over the past 5 years and new technology is expanding within Ethiopia. Oil prices and climate changes are driving new legislation globally and may bring new opportunity around electric power sources from rivers and increasing global labour costs could open up new markets pulling labour from rural communities

A clear understanding of the resources, skills, materials and equipment will be core factors in the WRDB's ability to retain / attract funding from Federal, and other agency sources such as the Capacity Building Fund – UNICEF administered. The Capacity Building area of Business Planning, Budgeting and Financial Control is an area that PAWS could support in the future

The focus would be on fully understanding the access routes to resources and financing, a gap analysis on the resources to deliver against the WRDB mandate and targets, the appropriateness and ability to change targets and long term objectives, the timescales and impact on the business of change, the establishment on medium and short term targets and implementation of change to achieve the long term vision. Some of the recommendations in this report would require increase funding and resources and it is most important that the appropriateness, ability to access and limiting factors are known at the earlier stage



## 6.0 IMPLEMENTATION

The implementation of these recommendations will be phased to both utilise the current resources and skill of the WRDB and to ensure that the new skills and competencies are in place to support later phases of the programme. It is also important that the programme is aligned to activities and projects being delivered by Federal Ministries or other agencies.

### 6.1 PHASED DELIVERY

The phased delivery programme should cover the following key activities:

- To develop an increased knowledge of the SNNPR-WRDB assets, by collecting and collating asset information into a database that will identify site, location, source type, etc. The database will be built on the information collated from previous projects, and will build on the work being undertaken by JICA and SNV
  - To Identify all the sites that are currently out of production within the SNNPR, with site reference, location and site type (shallow well, deep well or protected spring) to support the mapping of the re-commissioning sites onto a map to support program management
- To implement a monitoring policy and procedure which will identify water resource information to be collated from each site, with type of data, data frequency and control mechanisms to measure against MDG and UAP targets
  - Design and implement simple training short courses in basic village level hydrometric monitoring to allow early diagnosis of source yield issues. Initial “training of trainers” to be delivered at Zone or Woreda level.
  - Design a suitable monitoring network that will enable the assessment of well, borehole or spring performance, of local and/or regional water resource issues and allow differentiation between them
  - To identify all sites where hydrometric monitoring (groundwater level dipping) is not feasible due to sealed well and borehole headworks and the lack of “dip tubes”, to produce a programme of modifications to facilitate the collection of this data.
  - Review equipment standardisation and need for modifications to assist access for monitoring and/or repair, linked with supply chain optimisation.
  - Develop a two page summary to be attached to each source highlighting key asset information, including general asset maintenance and reliable monitoring data.



Template to be provided by PAWS, before being finalised and translated as appropriate to each site. See appendix

- Establish and maintain an asset database of all improved water sources to assist in decision making regarding appropriate recommissioning response. This database to be managed via the lowest appropriate Water Resources Bureau level.
- Develop and formalise management and monitoring data reporting ‘down from’ and ‘up to’ appropriate levels within existing Water Bureau structure in order to enable appropriate and timely response to re-commissioning issues.
- To highlight the most appropriate centre of excellence within each zone for the purpose of coordinating re-commissioning activities. This will include the skills, resources, facilities and location and may be focused within either high or low performing Woredas
- To link WRDB Capacity development with other initiatives being delivered within the region to ensure that maximum benefit is achieved. This will include working with key agencies, ministries to delivered a sustainable future including TVTC’s and JICA
- Develop and formalize management of relationships with water and sanitation NGO’s and other service providers
- Review and define the WRDB’s operating mandate, in relationship to the ability to deliver within the current frameworks, and develop a water policy to clearly outline the role and responsibilities of WRDB
- Develop the existing budgetary and action plan process into an auditable business plan with a structured road map for dealing with recommissioning and business improvement.
- Support the development of appropriate operational, technical and financial guidelines to enable the implementation of the regional water sector strategy, utilising resource and funds from both within the bureau and via external sources.
- To continue to assess the impact on human capacity from changes within the Federal Structure and legal framework within which the WRDB operates, including the potential role of a state and/or national regulatory agency to monitor the provision of water services strategy



## 6.2 INITIAL STAGES

It is recommended that in the short term the SNNPR WRDB should consider the following tasks in conjunction with PAWS and other appropriate partners.

- Assess Current levels of Project, Programme and Relationship Management skills within the WRDB

***Target date – July 2008***

- Identify appropriate personnel to become the trainers to deliver the ongoing monitoring work and conduct “training of trainers”.

***Target date – July 2008***

- Work to review strategy and policy integration on Water Supply and Sanitation

***Target date – Sept 2008***

- Identify potential “Centres of Excellence” to support decentralized operational centres to assist the Woreda Water Desks

***Target date – Sept 2008***

- Review Business Plan to identify budgetary and resource constraints and critically assess areas of concern

***Target date – Sept 2008***

- Assess the appropriateness of the storage of asset information and review the benefits of developing a fully integrated, auditable and regional database.

***Target date – Sept 2008***

- Review the type, amount and standard of asset monitoring data being collected and where it is stored and reported - including training where appropriate.

***Target date – Sept 2008***

- WRDB to coordinate a baseline survey of the regional asset condition in order to inform and update the asset database

***Target date – December 2008***



### **6.3 FOLLOW UP STAGES**

Capacity building is an ongoing process and it is important to continually monitor progress against a set of deliverable. PAWS is keen that the support process continues until there is evidence of sustainable development within the organization. The level of this support would be tailored to the needs agreed by the SNNPR WRDB and could vary from briefings and updates from the WRDB, to further work and the scope of additional projects



## 7.0 DEVELOPMENT PLAN

Any Development Plan proposed must be realistic and achievable. The proposal is a twin track approach will aid the SNNPR WRDB to balance resources to look at the condition of the assets (springs, wells and boreholes etc) alongside looking at the gaps in human resource capacity. It is recognize that the two issues are interlinked. It is also recognized that to be truly useful the plan should be refined and if required modified with discussion between PAWS the WRDB and local partners. SNV, JICA , Awassa University and the TVTC are thought to be particularly critical to this process.

The initial phases as proposed under Section 6.2 will guide the WRDB to review and record the true state of the asset. This is a key first step, as until there is reasonable knowledge to confirm what assets are where, whether they are working or not and if not why, as without this any progress on recommissioning would be difficult, inefficient and unsustainable. This task is therefore proposed as an early and essential requirement.

In order to carry out this task staff will need to be selected / coached / trained in critical data collected, collated and analysis. This initial baseline survey, much of which may already be available in some form or other and perhaps held by several agencies, should be turned into an ongoing and sustainable monitoring and evaluation system with dedicated reporting lines etc.

Relationships with the WRDB partners will also need to be coordinated and managed, this may require staff to have additional training in Programme, Project and Relationship Management to ensure these relationships are properly and sensitively managed to promote effective and clear lines of responsibility and feedback.

Looking forward (but not too far!) budgetary issues, policy integration and ongoing human capacity development must be tackled to ensure that the right resources are in the right place. Responsibility for recommissioning is understood by all parties to have to be pushed down to the lowest appropriate level. However, with responsibility must go the budgets and resources to meet those responsibilities and this will be a challenge for the Regional WRDB to manage effectively.



## **8.0 NEXT STEPS**

The next step will involve the collation of feedback from the key parties contributing to the report, together with the inclusion of any amendments following this feedback. In addition supporting evidence, justification and updates from Agencies on items that will influencing any of the recommendations of the report. It is envisioned that this feedback process will be concluded by the end of May 2008, and will enable the final report to be a working document to support the SNNPR in delivering the MDG and UAP targets.

- a. Review recommendations with the SNNPR WRDB**
- b. Identify agencies / resources best place to progress recommendations**
- c. Collate information on current water resources monitoring data**
- d. Collate information on current water resource asset information**
- e. Updates on the current programs and initiatives supporting the SNNPR WRDB**
- f. PAWS Support**

PAWS can offer support for training in the following areas.

- Basic Field Hydrometric Data Collection, Recording and Analysis - this could be done at Woreda level and could include representatives from the Washcos, local schools and health clinics.
- Asset Database Creation and Management – Woreda or Zonal level
- Electro Submersible Pump Maintenance
- Asset Maintenance Project Management
- Reviewing Corporate Structure and Organisation
- Corporate Business Planning, Budgeting and Financial Management



## 9.0 REPORT AGAINST TERMS OF REFERENCE



## 10.0 REFERENCES

MENGISTU E, REGASSA N, YUSUFE A, GEBRE-MEDHIN S. February 2008. Implementation of Universal Access Plan (UAP) in SNNPR: A Case Study *Submitted to: RIPPLE Ethiopia.*

Et al - South Nation, Nationalities and Peoples Region (SNNPR) – Background Information



## 11.0 APPENDICES



## Appendix 1

### Terms of Reference

<b>PROJECT NO:</b>	<b>88-Eth</b>
<b>Project Title</b>	Training support for the re-commissioning of water supply schemes in Southern Nations, Nationalities and People's Region (SNNPR), Ethiopia.
<b>Justification</b>	<p>Adequate water supply coverage in SNNPR can only be attained if all of the existing 6,000+ water supply schemes in the Region are in operation. More than 30% of schemes (over 2,000) are currently not functioning. This is preventing the Region from effectively addressing the Universal Access Plan for water, or supporting the national MDG target for water supply.</p> <p>A PAWS scoping visit in January 2007 (40-Eth) identified limited capacity within the Region's Water Resources Bureau (WRDB), water desks at zonal and woreda level and within water committees. The visit report recommended a programme of technical and project management training to support the re-commissioning of existing schemes.</p> <p>The Water Resources Bureau (WRDB) of SNNPR has asked PAWS to help establish needs-based training packages for re-commissioning water schemes, as those responsible for the re-commissioning are not sufficiently trained.</p>
<b>Objectives</b>	<p>This follow-up project aims to develop needs-based training materials and to deliver initial training packages, to support sustainable re-commissioning of water schemes.</p> <p>It also aims to provide technical and management support for implementing the Region's water sector strategy, by assisting in the development of appropriate guidelines and manuals to help build the capacity of staff in the WRDB.</p>
<b>Deliverables</b>	The PAWS UK team will work in conjunction with the WRDB, Technical Vocational Training Colleges (TVTCs) in SNNPR, UNICEF, SNV, JICA, RiPPLE <sup>1</sup> and other key stakeholders who are currently working in the area of capacity building with the WRDB, to carry out a training needs assessment and develop appropriate training packages. This will lead to supporting the preparation of training guidelines and/or manuals.

<sup>1</sup> SNV is a Dutch NGO, JICA is the Japanese Development Agency and RiPPLE is Research-inspired Policy and Practice Learning in Ethiopia and the Nile Region, a DFID-funded research programme consortium.



	<p>The key activities are:</p> <ul style="list-style-type: none"> <li>▪ Training needs assessment, based around typical schemes.</li> <li>▪ Investigate the application and suitability of existing training policy.</li> <li>▪ Provide technical expertise to amend existing training curriculum, reflecting and enhancing the standardization of equipment (including addressing supply chains).</li> <li>▪ Work with other key stakeholders to develop appropriate training materials (such as guidelines and manuals), making use of existing materials where possible, to deliver training using standardized training packages.</li> <li>▪ Conduct initial training, supported by workshops where appropriate.</li> </ul> <p>Key deliverables include:</p> <ul style="list-style-type: none"> <li>▪ Report on identified training needs, based on the assessment process and initial visit workshop;</li> <li>▪ Identified materials for delivering training packages;</li> <li>▪ Input to initial training packages (in 3 phases);</li> <li>▪ Monitoring and evaluation reports.</li> </ul>
<p><b>Impact</b></p>	<p>This support to SNNPR's WRDB will help to improve the sustainability of water supply for up to 200,000 people.</p> <p>Providing support to the WRDB in aspects of defining roles and responsibilities of WRDB staff involved in re-commissioning schemes and engaging with local communities, will improve the accountability of local water service delivery.</p>
<p><b>Scope</b></p>	<p>The scope of input required by the PAWS UK partner includes:</p> <ul style="list-style-type: none"> <li>▪ Assessment of current levels of experience amongst key stakeholders (WRDB staff, water committees, etc.);</li> <li>▪ Developing training packages for re-commissioning schemes, based on a participatory needs-assessment;</li> <li>▪ Delivery of capacity building support to implement the training packages (Training of Trainers (ToT));</li> <li>▪ Monitoring the capacity of trained staff to implement learning and an impact assessment of the training.</li> </ul> <p>The content of the training packages will be developed through a needs-based assessment process, but the WRDB has requested that it considers:</p> <ul style="list-style-type: none"> <li>▪ appropriate levels of service (based on water availability) applicable on a community/scheme basis;</li> <li>▪ systems for defining roles and responsibilities for scheme management, from regional (zonal) to community level;</li> <li>▪ systems for analyzing current processes for managing schemes</li> </ul>



	<p>and stakeholder engagement;</p> <ul style="list-style-type: none"> <li>▪ assessment of investment criteria in the water sector;</li> <li>▪ scoring systems to enable consistent prioritization of schemes, including phased implementation; and</li> <li>▪ ways of exploring public/private initiatives and/or participation.</li> </ul>
<p><b>Organisation and methodology</b></p>	<p>It is anticipated that this project requires a team of 2 people, offering complementary skills and experience in areas including project management, operation and maintenance of water schemes, training and needs assessment.</p> <p>The lead contact within the WRDB will be Ato Nuredin Asaro, Head of the Water Supply and Sanitation Department, supported by Ato Agosa Abate, the Vice Bureau Head (reporting to Ato Jemal Reshid, the Bureau Head).</p> <p>The WRDB will complete the assessment of a representative sample of existing water supply schemes and submit this assessment to the PAWS UK team. The PAWS UK team and the WRDB will review this assessment during a one day workshop, followed by 5-day visit to selected schemes and stakeholders (UNICEF, JICA, SNV, RiPPLE, Hawassa University, etc.). This visit will include representative visits to schemes, combined with meetings with staff of the WRDB, to finalize and agree the content of training packages for re-commissioning.</p> <p>The WRDB will facilitate the cooperation and input of other key stakeholders, to enhance integration among various actors. The Bureau will assign a focal person within its structure to be responsible for coordination.</p> <p>The PAWS UK team will develop a report identifying draft training packages within one month of the initial visit, and issue this to the WRDB. Following the receipt of appropriate feedback from the WRDB and other key stakeholders, the UK team will prepare a final report. The training will then be carried out in 3 phases (see below).</p> <p>The extent of PAWS UK team input to the actual delivery of capacity building / ToT training will be based on the agreed recommendations from their reports.</p> <p>Feedback from each capacity building / ToT phase will be reviewed by the WRDB.</p>
<p><b>Milestone plan</b></p>	<p>Initial training needs assessment is intended to take place during the last week of February or first week of March 2008. This will consist of:</p> <ul style="list-style-type: none"> <li>▪ One day workshop attended by WRDB staff, UNICEF, JICA, SNV, RiPPLE and Hawassa University.</li> </ul>



	<ul style="list-style-type: none"> <li>▪ Site visit (5 days) to selected schemes and stakeholders.</li> </ul> <p>Draft training package report (4 weeks after the initial visit)</p> <p>Final training package report (4 weeks after receipt of feedback from WRDB and other key stakeholders)</p> <p>Delivery of capacity building/training in three phases: (timing to be agreed during workshop – but likely to take place over 3-6 months)</p> <ul style="list-style-type: none"> <li>▪ <b>Phase I:</b> Conduct training and provide support on developing &amp; standardizing <b>guidelines and manuals</b>, (customizing byelaws, policy integration, preparing design and construction manuals, etc.).</li> <li>▪ <b>Phase II :</b> Conduct training on <b>scheme administration</b> (planning and project management, roles and responsibilities of stakeholders, communication, financial management, water and health education, etc.)</li> <li>▪ <b>Phase III:</b> Conduct training on <b>scheme operation &amp; maintenance</b> (addressing aspects of technologies, standardization, etc.)</li> </ul>
<p><b>Resource estimate</b></p>	<p>Input from the PAWS UK team will be phased over a number of activities and visits. For each person in the team, this is expected to comprise the following:</p> <p>Initial visit: 7 days, allowing 2 days preparation in the UK and 5 days visiting in Ethiopia</p> <p>Development of draft training package report: 3 days for writing</p> <p>Development of final training package report: 3 days for writing.</p> <p>Each of the 3 training phases: 2 days preparation in the UK and 5 days for training in Ethiopia.</p> <p>Ongoing monitoring and evaluation: up to ½ day per month in the UK, with possible return visit to Ethiopia (to be agreed).</p>
<p><b>Dependencies</b></p>	<p>Timely access to existing documentation and effective communication with the WRDB will be crucial to ensure this work is carried out successfully and efficiently. This will be assisted by the PAWS Country Manager.</p>
<p><b>Issues/Risks</b></p>	<p><b>Risk:</b> Lack of available existing documentation.</p> <p><b>Mitigation:</b> The Country Manager will approach WRDB to secure as many documents as possible prior to the 1<sup>st</sup> visit, to enable the UK team to prepare as much as possible in advance.</p> <p><b>Risk:</b> It is not possible to meet all the relevant stakeholders during one</p>



	<p>trip to Awassa.</p> <p><b>Mitigation:</b> The Country Manager will prepare a visit programme in advance, to secure interviews with all relevant people.</p> <p><b>Risk:</b> In country health, safety and security.</p> <p><b>Mitigation:</b> Country Manager / Secretariat to work with the UK team to undertake robust Health and Safety and Risk Assessment prior to each visit.</p>
<b>Communications Strategy</b>	<p>The key contact in Ethiopia is the PAWS Country Manager.</p> <p>Ato Nuredin <b>Asaro</b> will be the key contact for all the support provided by and to WRDB staff. The Deputy Head and the Head of the Bureau will receive regular reports from him.</p> <p>Direct communication between the PAWS UK team and Ato Nuredin Asaro will be established by the PAWS Country Manager as soon as is appropriate, but prior to the initial visit to Ethiopia.</p>
<b>Review Mechanism</b>	<p>Project specific review mechanisms can be agreed by the PAWS UK team, once they have been identified. A visit report will be prepared after each trip to Ethiopia, reporting against the visit objectives. In addition the Country Manager will feed into the Secretariat's quarterly reports on project progress, for submission to the Steering Group.</p> <p>On completion of the project, the PAWS UK team will be required to produce a final project report, detailing the project outcomes and impacts.</p>
<b>Approvals appropriate) (as</b>	<p>Head of WRDB – Ato Jamal Reshid          Deputy Head of WRDB – Agossa Abate          Department Head of WS of the WRDB - Nuredin Asaro          PAWS Secretariat - Rebecca Scott, Project Manager, Jan 2008</p>
<b>Compiled by</b>	PAWS Country Manager – Melkamu Jaleta
<b>Date</b>	31 <sup>st</sup> January 2008



## Appendix 2

### **SNNPR – WRDB – Workshop Agenda – Awassa 4<sup>th</sup> March 2008**

- 8:30 - 8:45 Registration & Networking  
8:45 - 9:00 Opening address: SNNPR – WRDB management  
9:00 - 9:30 Water Supply – Scheme & Operational Management (Best Practice) - By PAWS Project team  
9:30 - 10:00 Existing Situations and problems of Water Supply and Sanitations in SNNPR – By WRDB

Tea Break (10:00 – 10:30)

- 10:30 - 11:30 Discussion on the two presentations  
11:30 - 12:00 Briefings by representatives of institutions engaged in Capacity Building support to the WRDB including  
- JICA  
- SNV  
- TVTC  
- RIPPLe  
- Hawassa University  
- UNICEF  
- any additional attendees,  
12:00 - 12:30 Capacity Building training initiatives and methodologies in the sector – Open  
12:30 - 1:00 Effective coordination of Water Sector Resources – Open Discussion

Lunch Break (1:00 – 2:00)

- 2:00 - 2:30 Water Sector technical and vocational training centres for Capacity Building – Open Discussion  
2:30 - 3:00 Standardisation of equipments and scheme financing in the Water Sector – Open Discussion  
3:00 - 3:30 Rap up and the way forward



## Appendix 3

### Key Agency work supporting SNNPR – WRDB

#### I. JICA

PAWS representatives met with JICA (Japan) at the SNNPR WRDB Awassa offices in March 2008. JICA also took part in the workshop held at that time. They are doing some very good work in capacity building within the WRDB around some key areas such as in the field training on handpump maintenance in approximately 80 Woredas in the region, developing reliable supply chains for handpump spare parts, promoting the training in the local manufacture of rope pumps which may have an important role to play in shallow wells, constructing a GIS system database for the WRDB. The projects has included the construction of water supply projects for 19 Woredas, where about 200 shallow wells with handpumps and about 20 spring waters supply systems have been completed. These activities make JICA an important partner in the drive for up-skilling and increasing ability to recommission failed pumps.

#### II. SNV

PAWS representatives met SNV in Awassa and they also took part in the workshop. SNV are key partners in this initiative. They are already carrying out very valuable baseline assessments of water supply schemes and have a good understanding of the reality of the situation on the ground. In addition they are already assisting the WRDB in developing strategic plans for the WashCos. Any further work in this area must be carried out in close liaison with SNV.

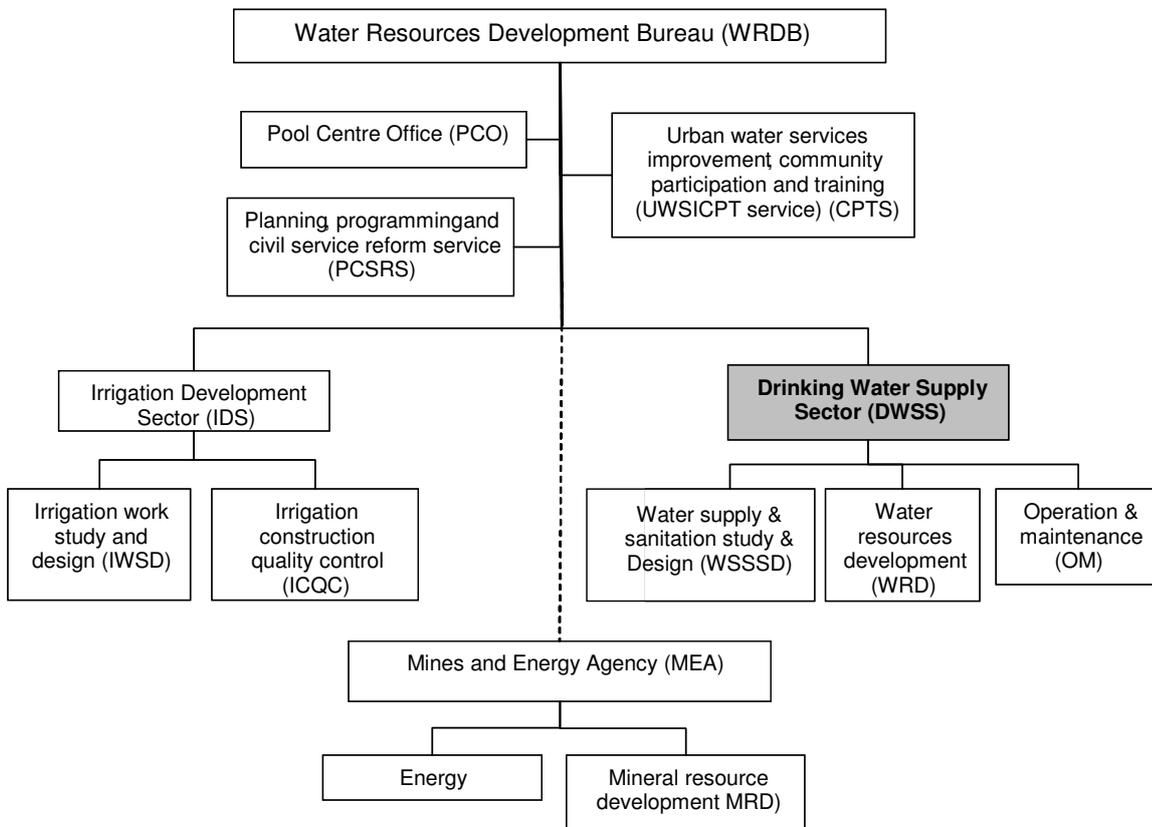
#### III. TVTC

The Technical and Vocational Training College in Awassa was visited by the PAWS reps during the field visit in March. A representative of the TVTC also attended the workshop. The Vice Head of the Academic Research Department outlined some of the difficulties that they face as an institution. Their main problem is that of workshop facilities and practically experienced lecturers and instructors. The course which was designed to be 30% theoretical and 70% practical is in fact around 90% theoretical for the reasons already given. It is understood that DFID is beginning to work with the TVTCs to try and assist in the training of trainers and raise the level of practical knowledge.



**Appendix 5**  
**Diagrams from “Implementation of Universal Access Plan (UAP) in SNNPR: A Case Study (Mengistu et al 2008)**

**SNNPR – WRDB – Water Bureau Structure & Resources**





## Appendix 5

### *Human Resource profiles of the regional water bureau, water supply and sanitation study and design department.*

<b>Resource Gender Base</b>	<b>No</b>
Male	191
Female	30
Total	221

<b>Role Mixed</b>	<b>No</b>
Professional	112
Support	109
Total	221

<b>Skills base</b>	<b>No</b>
MSc	29
BSc	46
Advance Diploma	2
Diploma	33
Vocational / Technical	40
Twelve Grade completed	71
Total	221

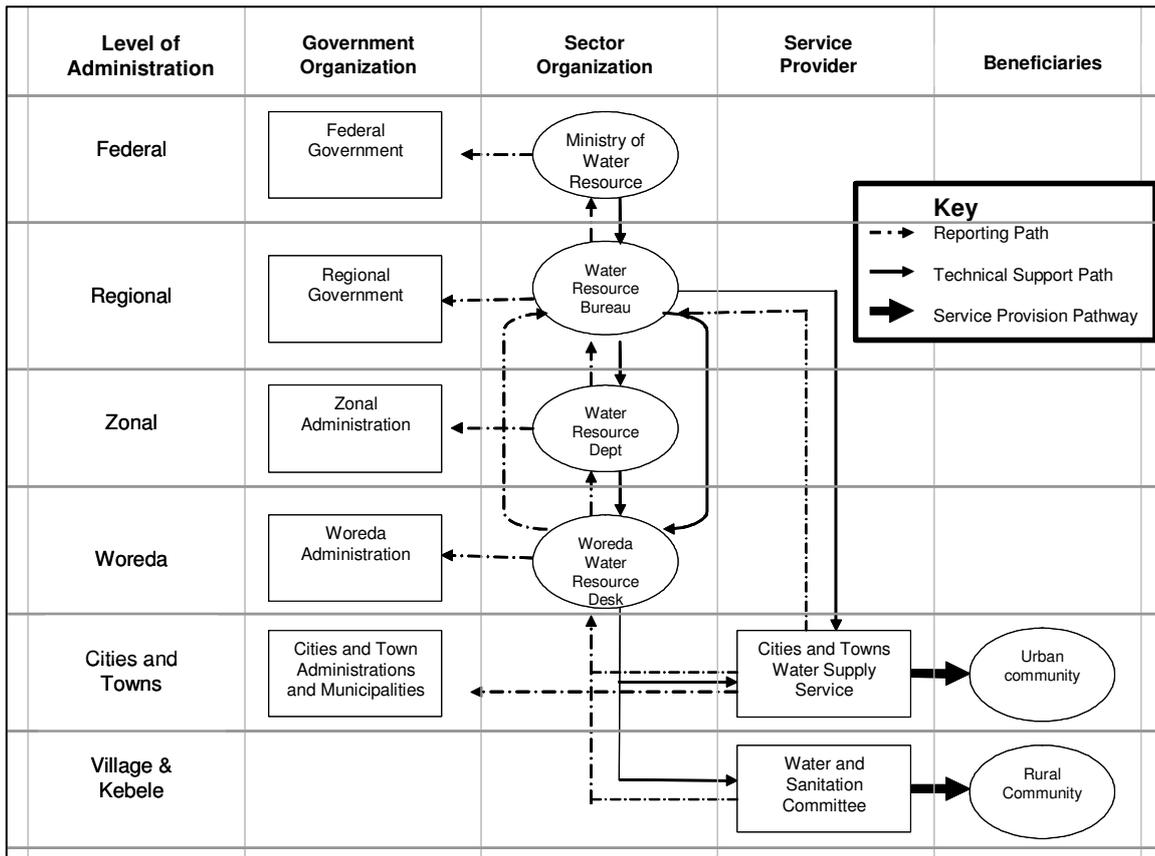


**Manpower profile of the Regional Water Bureau, water supply and sanitation study and design department**

Job title	Qualification Field of Specialization	Level of Qualification	No
Department Head		M.Sc	1
Study and Design Team			
Team leader	Environmental System Analysis	M.Sc	1
Hydrologist	Geology	M.Sc	1
Geo-Physist	Hydrology	M.Sc	1
Sanitary Engineer	Sanitary Engineering	B.Sc	1
Geo-Technical Engineer	Engineering Geology	M.Sc	1
Geologist	Geology and Mining	B.Sc	1
Civil engineer	Hydraulic Engineering	B.Sc	1
Surveyor	Surveying, Construction Technology	Diploma	2
Draftsman	Surveying, Drafting	Diploma	2
Water Construction, Supervision and control Team			
Team Leader	Geology	B.Sc	1
Hydraulic Engineer	Hydraulic Engineering	B.Sc	1
Civil engineer	Irrigation Engineering	B.Sc	1
Hydrologist	Hydrology, Applied Geophysics	MSC	2
Price Study & Control Expert	Hydraulics Engineering	B.Sc	1
<b>Total</b>			<b>18</b>

## Appendix 5

### Institutional Arrangement of water Sector





## Appendix 6

### Typical Issues Associated with Different Types of Improved Source

Source Type	Common problems	Result	Likely Solution	Skills and equipment required
Springs	Over pressure by high wet season discharges and insufficient overflow capacity on spring chambers causing the spring chambers to fail	Spring bypasses the chamber and doesn't flow (i) down pipe to water point and is open to (ii) surface contamination	Repairs to concrete spring chamber, in extreme cases demolish and start again	Mason, labourers  Tools, cement, sand, rebar  Local transport
	Pipe damage or failure of delivery line	Leakage in delivery system causing failure of water to reach tanks or water points	Repair or replacement of pipe	Pipe technician, labourers Pipe, tools Local transport
	Root growth within spring chamber	Blockage of pipes causes cessation of flow and can in extreme cases lead to spring chamber failure due to over pressure	Regular inspection and root clearing. Repair to concrete spring tank in extreme cases	Labourer / artisan (mason if repairs required)  Cutting tools
	Spring dries due to lack of recharge	Reduced or no flow from spring	None	Hydrogeological advice



Source Type	Common problems	Result	Likely Solution	Skills and equipment required
Shallow Wells with Handpumps	Handpump - failure of a component on the visible part of the pump superstructure	Inoperable handpump – well unusable or bucket used to dip water from well if diameter allows	Repair or replacement of component or whole pump	Pump technician  Tools, adequate spare parts  Local transport
	Handpump - failure of foot valve or other component within the pump cylinder	Inoperable handpump – well unusable or bucket used to dip water from well if diameter allows	Repair or replacement of component or whole pump	Pump technician, labourers  Tripod, hoist, tools, spare parts  Local transport if lifting equipment is local
	Partial collapse within the well and or failure of well screen	Sand pumping, dirty water, pump failure	Remove pump, re-excavate well rebuild lining	Pump technician, Hydrogeologist, labourers  Tripod, hoist, tools, spare parts, well screen, cement, sand.  Local transport
	Clogging by iron biofouling or other deposit	Yield reduction or increased effort required as water levels begin to lower	Remove pump, brush or jet screen to remove encrustation (or chemical cleaning)	Hydrogeologist, labourers.  Tripod, hoist, well screen cleaning equipment, chemicals  Transport required
	Low water levels due to lack of recharge	Reduction or loss of yield	Deepen well if possible	As above
Source Type	Common problems	Result	Likely Solution	Skills and equipment required
Deep wells or boreholes with handpumps	As above	As above	As above	As above



Source Type	Common problems	Result	Likely Solution	Skills and equipment required
Deep Boreholes with electric submersible pumps and generators	Pump failure	Source unusable	Pump removal and repair, replace with standby pump	Pump technician, electrician, labourers  Spare pump, tripod, hoist or crane.  Transport required
	Rising main failure	Reduced yield, air entrainment causing cloudy water, damage to structure of borehole by jetting water	Pump removal, replace or repair rising main. Repair to borehole screen if required	Pump technician, electrician, labourers  Replacement rising main, tools tripod, hoist or crane
	Generator fault	No electricity pump inoperable	Repair generator	Electrician, mechanic  Spare parts and diagnostic tools.
	Pipe failure on delivery system	Leakage, contamination of water	Detect and repair leak or replace pipe.	Pipe technician, labourers Tools, spare pipes and fittings Local transport
	Clogging by iron biofouling or other deposit	Lowering of water levels, reduction of yield	Remove pump and scrub brush or jet encrustation from screen, Chemical cleaning	,Hydrogeologist ,borehole specialist  hoist ,tripod ,tools or crane
	Low water levels due to lack of recharge	Air entrainment, loss of yield or pump performance, borehole failure	Remove pump, deepen borehole, replace pump if damaged.	Hydrogeologist, borehole specialist  Drilling rig



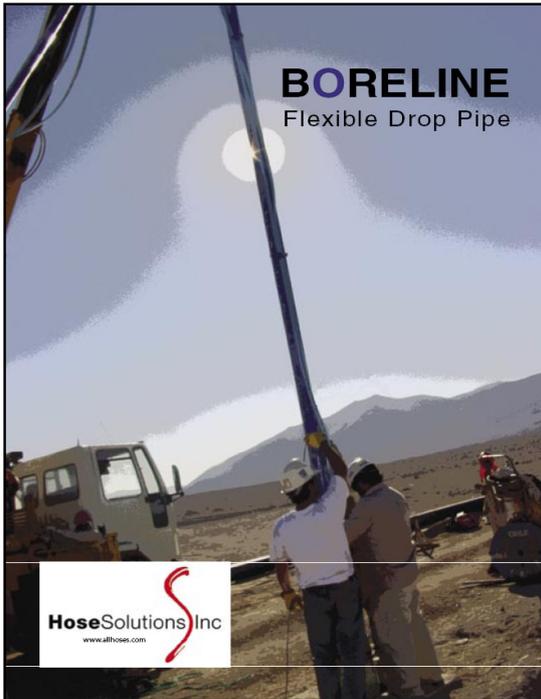
## Appendix 7

### List of Participant of the 4<sup>th</sup> March, 2008 Re- commissioning Workshop that held at SNNPR WRDB, Awassa

No	Name	Organisation	Responsibility
1	Jamal Reshid	WRDB	Head
2	Agosa Abate	WRDB	Deputy Head
3	Nuredin Asaro	WRDB	Dep't Head
4	Abdulkerim Nesur	WRDB	Public Relation Head
5	Kassu Eshete	WRDB	A/Head of WSICTS
6	Yared Julo	WRDB	Team Leader
7	Alemayehu Negash	WRDB	Team Leader
8	Teshome Mulu	Gurage Zone WRDO	Team Leader
9	Wondu Gudeta	Awassa TVET	Instructor
10	Jackson Wandera	SNV/ South Office	WASH Governance Advisor
11	Abrham Asha	WRDB	Hydrologist
12	Aschalew Sidelil	RiPPLE	Woreda Coordinator
13	Daniel Demisse	WRDB	Planning Expert
14	Asfaw Abeme	Kambata Zone WRDO	Head
15	Titsuji NIWANO	JICA	Project Team Leader
16	Mellesse Chufamo	WRDB	Resettlement Program Coordinator
17	Seifu Belete	WRDB	Planning Service A/ Head
18	Desalegn Doche	Wolita zone WRDO	Head
19	Tsegaw Worku	WRDB	Expert
20	Dereje Jebo	Gedio Zone WRDO	Head
21	Chris Chambers	Wessex Water	PAWS UK Lead Expert
22	Paul Stanfield	Wessex Water	PAWS UK Lead Expert
23	Melkamu Jaleta	PAWS Ethiopia	Country Manager

## Appendix 8

### Flexible Submersible Pump Rising Main



#### The BORELINE Advantage

There is no easier way to install submersible pumps than with BORELINE Flexible Drop Pipe. Designed to keep it simple, safe and efficient.



Consider the BORELINE advantages:

- SAFE**
  - Very Simple Installation And Retrieval
  - Easy to Store, Handle And Transport
  - High Performance Design
- APPROVED**
  - NSF 61 Approved
  - UKAS, WRAS, SABS
  - ISO 9001 : 2000
- EFFICIENT**
  - Life Time Savings
- LONG LIFE**
  - 10 Year Warranty
  - Total Corrosion Resistance
  - Zero Maintenance Product



#### BORELINE – Installation Procedure

##### STEP 1

Connect BORELINE to pump



##### STEP 2

Attach power cable using BORELINE Cable Straps



##### STEP 3

Lift pump and lower BORELINE into well



**Vertical Installations** – use clamps to lower Boreline and pump  
**Horizontal Installations** – attach Boreline to vehicle and lower into well

#### BORELINE Specifications

NOMINAL SIZE	1"	1 1/2"	2"	3"	4"	5"	6"	8"
INSIDE DIAMETER	24 mm	40 mm	50 mm	76 mm	102 mm	127 mm	152 mm	202 mm
THEORETICAL BURST PRESSURE	70 bar 980 psi	65 bar 920 psi	65 bar 920 psi	60 bar 850 psi	58 bar 820 psi	58 bar 800 psi	58 bar 800 psi	42 bar 600 psi
OPERATING PRESSURE	35 bar 500 psi	30 bar 425 psi	30 bar 425 psi	25 bar 350 psi	25 bar 350 psi	22 bar 310 psi	22 bar 310 psi	14 bar 210 psi
THEORETICAL TENSILE STRENGTH	1400 kgs 3000 lbs	3000 kgs 7000 lbs	4000 kgs 9000 lbs	7000 kgs 16,000 lbs	12,000 kgs 26,000 lbs	15,000 kgs 33,000 lbs	20,000 kgs 44,000 lbs	22,000 kgs 46,000 lbs
WEIGHT OF BORELINE	0.20 kg/m 0.14 lbs/ft	0.50 kg/m 0.34 lbs/ft	0.55 kg/m 0.37 lbs/ft	0.95 kg/m 0.64 lbs/ft	1.40 kg/m 0.94 lbs/ft	1.70 kg/m 1.14 lbs/ft	2.50 kg/m 1.68 lbs/ft	3.40 kg/m 2.30 lbs/ft
OUTER DIAMETER OF FITTING	60 mm 2.70 in	80 mm 3.25 in	95 mm 3.75 in	140 mm 5.55 in	165 mm 6.50 in	200 mm 7.90 in	230 mm 9.10 in	320 mm 12.20 in
WEIGHT OF FITTING	2 kgs 4 lbs	3 kgs 7 lbs	4 kgs 9 lbs	8 kgs 18 lbs	10 kgs 23 lbs	15 kgs 33 lbs	18 kgs 40 lbs	26 kgs 58 lbs
WEIGHT OF WATER	0.6 kg/m 0.40 lbs/ft	2 kg/m 1.40 lbs/ft	3 kg/m 1.60 lbs/ft	6 kg/m 3.50 lbs/ft	10 kg/m 6.20 lbs/ft	15 kg/m 9.60 lbs/ft	21 kg/m 14 lbs/ft	37 kg/m 24 lbs/ft

Our policy of continuous improvement can result in changes to specifications without prior notice.



Appendix 9

Example of a two page asset summary sheet – Page 1

SNNPR WRB - Asset summary			
<b>Site information</b>			
Site id			
Name			
Description			
Type			
Grid Ref (xy)		Grid Ref (NGR)	
Directions			
Operational Date		Status	In use
<b>Location</b>			
Zone		Address	
Woreda			
Village			
Population			
Population date			
<b>Personnel</b>			
General Manager		Control Room contact	
Area Manager		Site contract	
Process Controller		Maintenance contact	
<b>Principle Asset</b>			
Principle Asset	Hand Pump	Process	Source
<b>Asset Information</b>			
Asset Id	1235112		
Regulatory code			
Capacity			
Construction		Built / installed date	
Condition			
Condition Date		Commissioned	
<b>Civil Asset Dimensions</b>			
Length (m)	n/a	Water level (m)	
Depth (m)	90		
Surface Area (m)	10		



**Example of a two page asset summary sheet – page 2**

